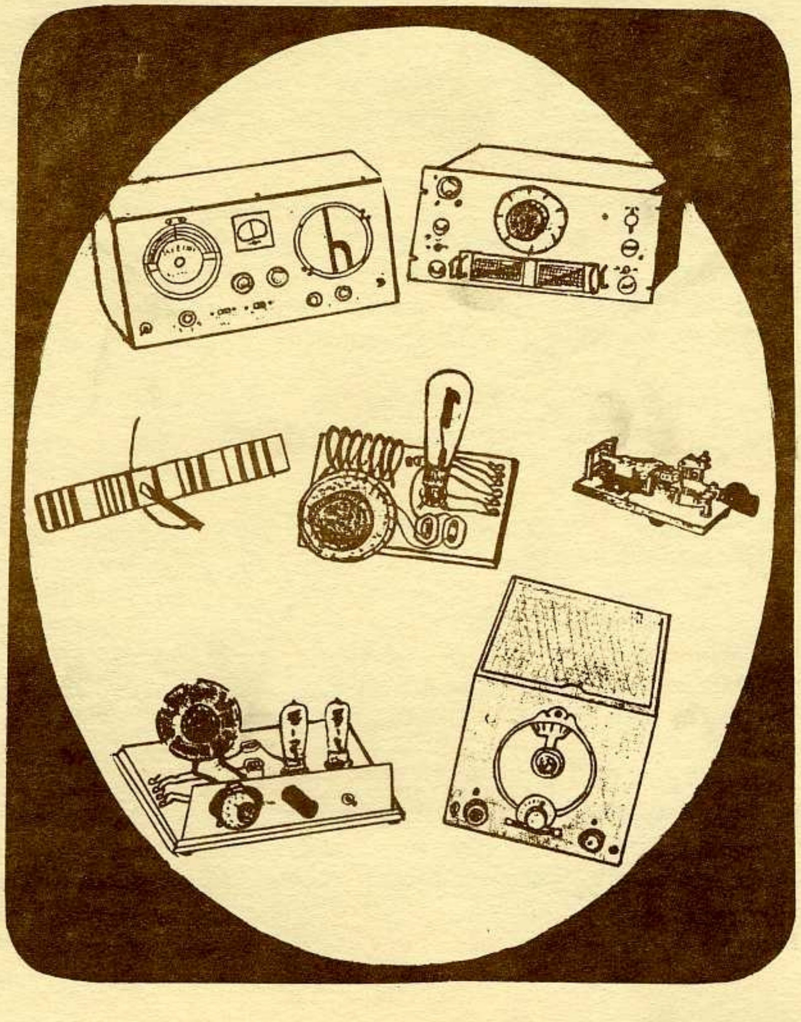
GOLDEN CLASSICS OF YESTERYEAR

A super collection of rigs, circuits & keys from amateur radio's romantic past.



BY DAVE INGRAM, K4TWJ

WELCOME TO THE GOLDEN DAYS OF YESTERYEAR

Return with us to those romantic days of yesteryear when excitement flourished with every turn of the dial and every night's operation was a thrilling new experience. Draw a wooden pencil arc off a copper tank coil, watch an antenna blink with your CW and see blue voltage flashes across a bug's shining contacts. This is Big Time ham radio indeed! Yes, dear friends there is a very special beauty in classic amateur radio gear that's simply unequalled by modern rigs with cold cases and impersonal digital readouts. It's a glamor that appeals to old-timers and newcomers alike, and holds more personal pleasure than restoring and driving a classic '32 roadster. Our included circuits put you right "in the driver's seat" with full 1988 pride!

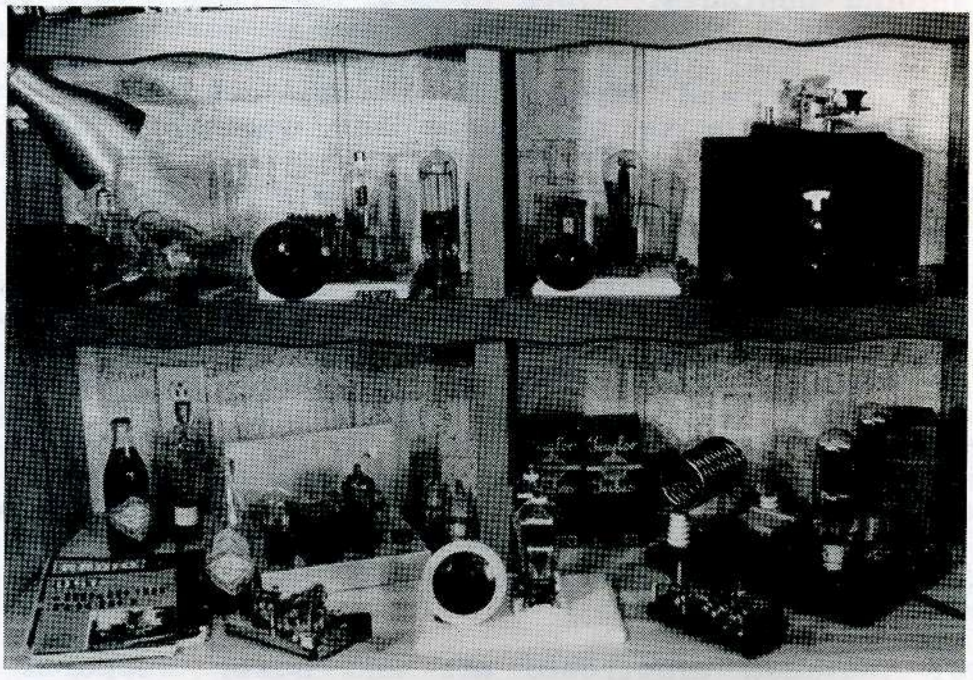
This book is a lighthearted romp through those fabulous days of yesteryear. It is not intended as a precise historical documentation or technical discussion of "who shot John." We will leave that to the genuine old-timers. Instead, we will tell you about unique and almost forgotten "collector's specials" you can build or restore and use on today's bands in high style and a heartwarming manner. That includes hotter'n red peppers transmitters that chase everything from DX to young single girls, receivers that still pick up old-time signals and even a genuine memory keyer made of wood!

Our included electronic wit and humor supports this book's underlying purpose of carving cherished views of past times into young amateurs' memories for passing to future generations. Achieving that most important goal is our greatest reward. We encourage you to home-assemble at least one of our included rigs...to work CW on a classic bug...or build a second version of your original first rig just for nostalgic fun. We are sure you will agree this is amateur radio romance supreme!

A wide array of "mix and match" ideas are included herein, and many rig details (like coil and tuning notes) are presented only once to save space. We urge you to read from page one forward rather than "skipping around." You can then decide if you prefer a copper coil or TNT design in a 201A transmitter, a two tube/201A receiver, or Lorenz coils for a Taylor T-20/Hartley transmitter. It's all fun, so enjoy to your heart's content.

This book's cover, design, typesetting and paste-up is compliments of XYL WB4OEE. Circuits and tales are compliments of friends, personal experiences, magazines and notes.

There were few significant variations in the "good ole days." Manufactured items and schematics in RADIO, QST, R9, etc. were amazingly similar! Thanks to everyone, including ARRL for their support of this venture and we look forward to working you "vintage rig style" in the near future! 73, Dave Ingram, K4TWJ



Part of the "Classic Corner" at K4TWJ. Clockwise from left top: copper coil Hartley transmitter for 30 meters is flanked by early "50 watter" tube (standing) and 852 tube (on side). National SW-3 receiver on right sits by one-tube QRP tx. Push-Pull TNT rig with 203As by new Taylor Tubes. Blue Racer bug in front. Two-tube receiver flanked by spare tubes, 1920 "Cokes", magazinges. Two-tube rig under construction in center bottom. Full details on rigs in text. These gems are beautiful to see and operate on today's bands. Some have only 8 parts and can be assembled in an hour's time. THE THRILL IS BACK!!!

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GOLDEN CLASSICS OF YESTERYEAR

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CHAPTER ONE

A SPARK FROM THE PAST

The very early days of amateur radio reflect a gusto era marked by turn-of-the-century excitement, hearty pioneers, and a fascinating variety of robust "wireless apparatus." Radio communications were a brand new interest, and home-brewed stations were often quite haywire in appearance. That situation obviously resulted from radio being more "electrical" than electronic in outward appearance.

A genuine 1910 style station typically consisted of a receiver with oat box-wound coil, home-fabricated tuning condenser, galena crystal detector (complete with adjustable catwhisker), and "baldy" earphones. The mating transmitter was comprised of a high voltage coil with primary circuit interrupter and secondary resonating circuit, battery(s), key, and a highly polished spark gap. Henry Ford's model "A" ignition coils were common in smaller setups with one to five miles range, huge Tesla coils and rotary spark gaps were popular in the real DXing rigs. Long multiwire "flattops" of whatever length one could muster were favored antennas.

Hundreds of fascinating true tales and historical details surround the classic age of spark communications (indeed, all eras of amateur radio's glamorous past!). Because this book is presented as a pleasant reflection of the fun and excitement connected with those times rather than a technical "who did what" documentation, however, let's revisit the 1910's with the following lighthearted story. These views of spark operation were related to us by Wilmer Goodman only weeks before he passed to the great ethereal waves in the heavens. Goodman did not remember his call, but no problem...it was typical-of-era "self assigned"!

Goodman's crystal receiver was complimented by a "several kilowatt" transmitter. The key literally flamed with high voltage, dimes were used for contacts, and visitors moving within a short distance of the transmitter were often jolted off their feet by leaping sparks (honest!). The smell of ozone filled the air, hair stood on end, and the antenna glowed purplish-blue while transmitting. Flames from the antenna occasionally arced into trees, and sometimes brush fires near the setup were common. Whew! Frequencies were relatively unknown during this early age. Operators merely used various size sparks and motor-driven gaps for transmitting and received by listening to each signal's distinctive buzzing notes. Most noteworthy was Goodman's 1914 contact with another amateur in South Africa. Both operators used simple crystal receivers! The days of Goodman's "dinosaur", however, were numbered by irate (frightened stiff?) neighbors and the impending clouds of World War I.

Goodman also recalled, radio amateurs along the eastern and western U.S. coasts were signing up as ship radio telegraphers and truly adding creditability to the term "operator." Visualize, for example, the following true-life scenario. As a "Sparky's" vessel moved from port, he would be found diligently copying and relaying messages at very high speeds. Enclosed in a small room the operator could not realize proximity to other ships with colossal power spark rigs. Those "big rigs" would suddenly fire up without notice, literally blowing the earphones off our hero and destroying his galena's detection spot. Quickly, without missing a word of copy, he would snap another galena into its holder, reset the catwhisker, and continue copying in the true amateur spirit. May those fond memories last forever!

Spark Rigs Revisited

Few photos of early spark rigs remain in circulation today, but their general diagrams and gusto memories remain in our hearts. Although a very small spark rig not connected to an antenna makes a fascinating home demonstration unit, such "transmit on all frequencies at once" rigs are now highly illegal. Therefore, a general sketch of a 1914 style setup is shown in Figure 1-1; not for home construction, but for pleasant reading and nostalgic enjoyment. The receiver utilizes a Quaker Oats cylindrical box as a coilform. The transmitter uses a high voltage coil with two close-spaced contacts. Gusto indeed!!

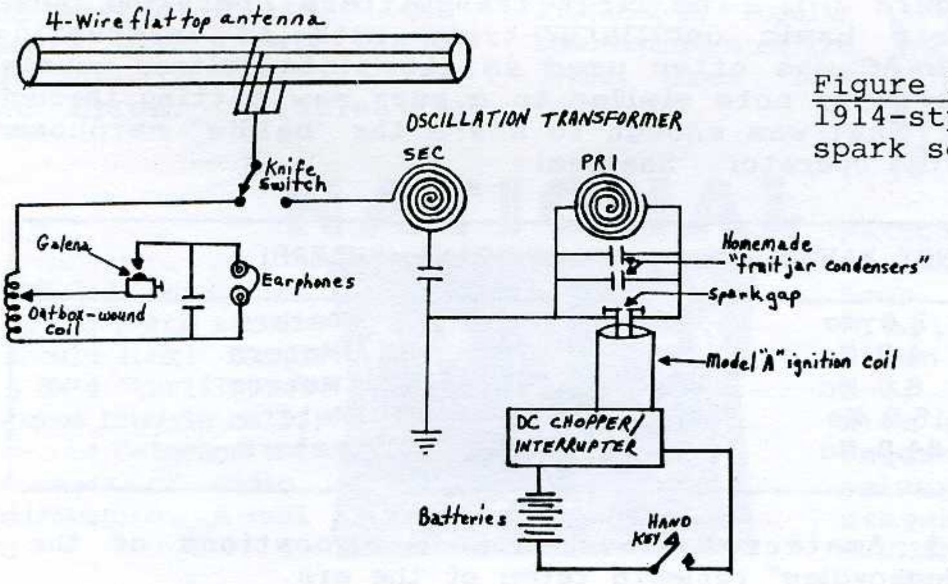


Figure 1-1. 1914-style spark setup.

CHAPTER TWO

EVER-POPULAR TALES & GEAR OF THE 1920s

The 1920's were an era of significant progress and transformation in the world of amateur radio. The use of specific wavelengths or frequencies acquired prominent foothold, spark communications were replaced by CW, Federal licensing moved into the limelight, and the soft glow of ever-classic vacuum tubes illuminated the path of future evolution. Thousands of exciting tales and noteworthy names were associated with this era, and several books are necessary to tell the "full story." Please understand if a particular tale, person or rig isn't included herein. Remember, this is a lighthearted book designed for your reading pleasure and inspiration in rebuilding classic rigs rather than a matter-of-fact historical documentation.

Especially interesting during the evolution of sparks was the "dividing point" of 200 meters. Frequencies below that point were considered prime spectrum and reserved primarily for commercial use while the vast (useless?) range above 200 meters was open to amateur experimentation. The true amateur radio spirit of "pursuing the impossible" or proving the DX benefits of shorter rather than longer wavelengths prevailed. Commercial opinions? Wait...look at what those crazy (clever?) hams are doing! Maybe we should quickly reconsider spectrum allocations! And reconsider they did...using the old "reservations versus free land" exchange pulled on the American Indians! Soon thereafter, amateurs were ushered onto the dedicated ham bands (reservations?) shown in Figure 2-1. The first transmitters operating these hambands were basic oscillator-types with an interesting "twist": raw AC was often used as the plate voltage source! It boasted a raspy note similar to a buzz saw cutting through a pine knot. That was enough to scare the "baldie" earphones off any devoted operator. Shazaam!

FREQUENCY RANGE	BAND (METERS)
1.5 - 2.0 Mc	150 - 200 Meters
3.5 - 4.0 Mc	75 - 85 Meters
7.0 - 8.0 Mc	38 - 42 Meters
14.0 - 16.0 Mc	18 - 21 Meters
56.0 - 64.0 Mc	4 - 5.3 Meters

Figure 2-1. Amateur Radio Frequency Allocations of the 1920's. "Megacycles" reflects terms of the era.

Progress marched on and the beautiful sounding (yet often unstable!) note of DC-powered transmitters made their proverbial trek to fame and popularity. Homebrew transmitters and receivers assembled "open air" style on readily available breadboards were a natural way of life, and the rural use of batteries encouraged low power operating. Regenerative receivers and self-excited transmitters were classic circuit designs of the era with names like Reinartz, and Hartley indelibly carved into every budding amateur's thoughts. Operating those strictly basic rigs was always an exciting and challenging experience. Bandspread was truly less than optimum (press a pencil's eraser against a dial's edge, and turn slowly!), tuned frequencies varied with hand capacity and in-room vibrations (drop a coffee cup and a prime DX station was lost forever!), and even antennas blowing in a breeze caused shifts in transmitted notes. Fun? You bet! DX? Yes indeed!

An enticing variety of "store-bought" parts and equipment supported every young amateur's interest during this early era. "Looking back" at some of those manufacturers listed in Figure 2-2 reveals both forgotten and familiar names of fame and fortune. Cardwell condensers, Weston meters and Pyrex insulators were well-known. Eby sockets, Chicago transformers and Clarostat pots survived the annals of time. Old-timers will surely remember Howard Radio, Knapp and Elkon. Fascinating!

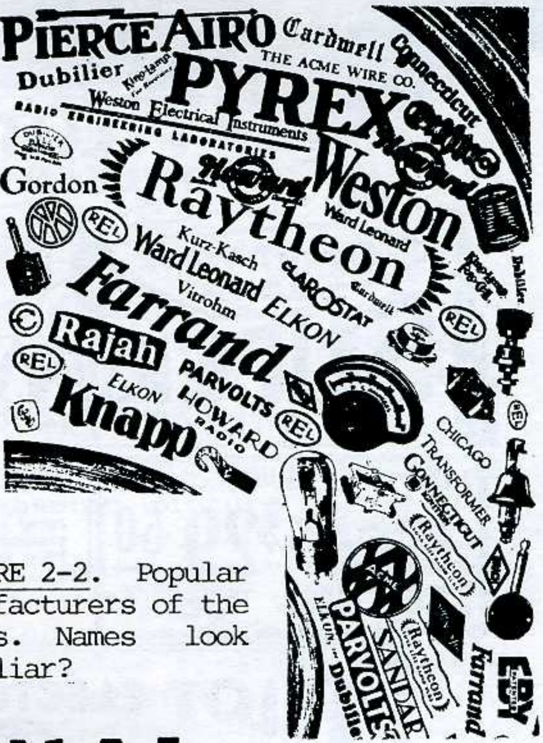


FIGURE 2-2. Popular manufacturers of the 1920s. Names look familiar?

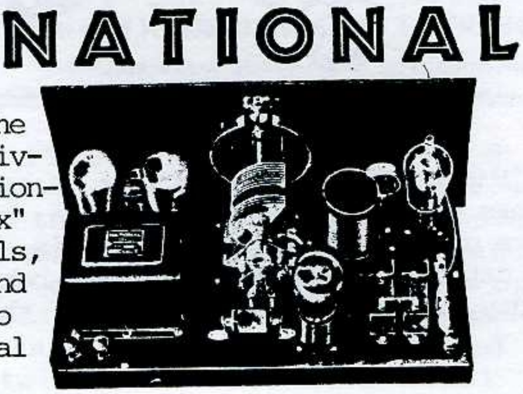
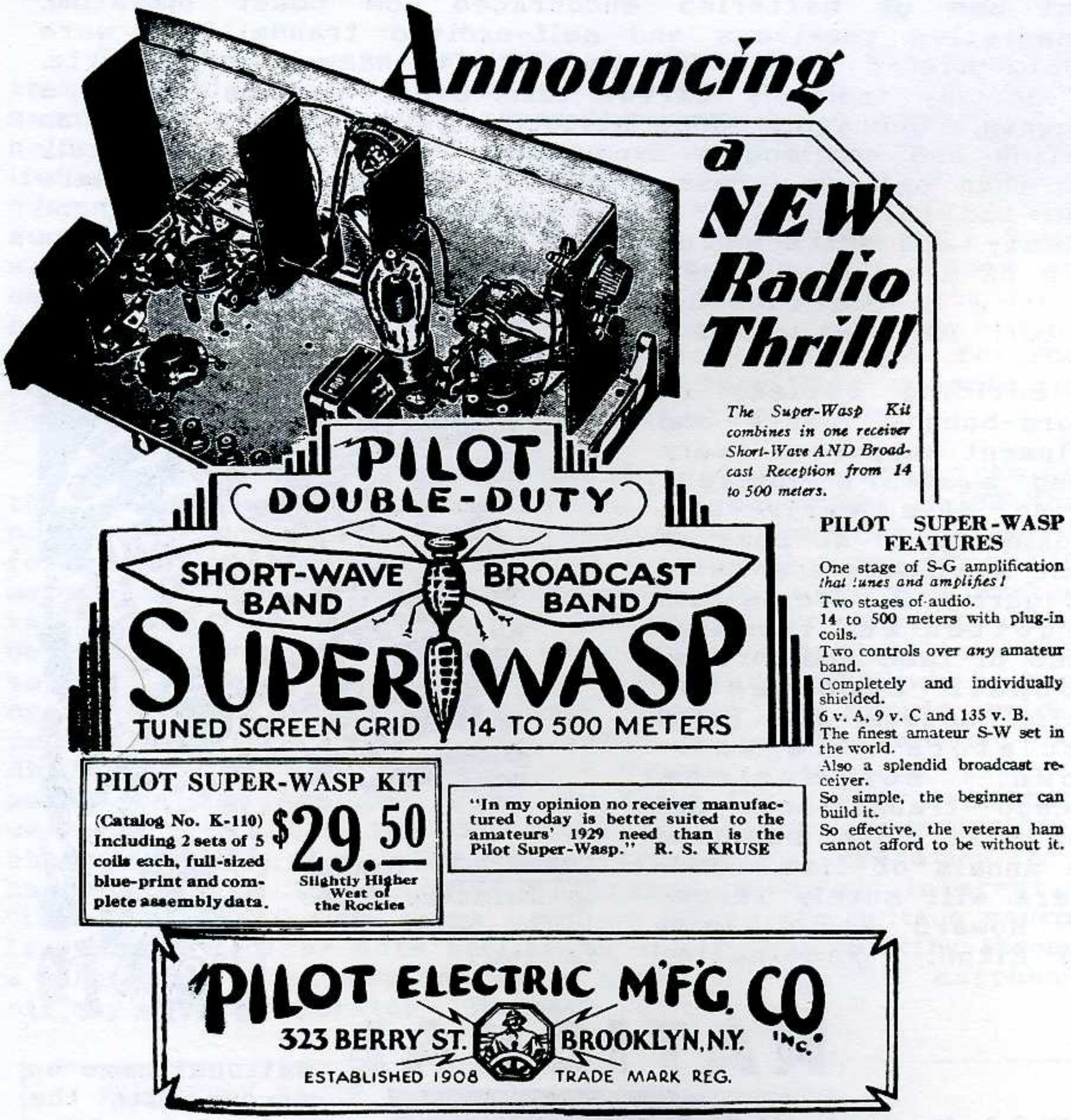


FIGURE 2-3 Here's the way a top notch receiver should look! National's SW-4 "Thrill Box" featured plug-in coils, 200A-tube detector and two stages of audio amplification. A real gem!

National came on strong with the four tube SW-4 "Thrill Box" shown in Figure 2-3; an impressive performing regenerative receiver with two stages of audio amplification.

Pilot's "Super Wasp" shown in Figure 2-4, however, was a stiff competitor...especially with its endorsement by the noted R.S. Kruse himself! Notice the use of a bent metal chassis behind the front panel for minimizing hand capacity while tuning. High performance indeed!



Announcing a NEW Radio Thrill!

The Super-Wasp Kit combines in one receiver Short-Wave AND Broadcast Reception from 14 to 500 meters.

PILOT DOUBLE-DUTY

SHORT-WAVE BAND BROADCAST BAND

SUPER WASP

TUNED SCREEN GRID 14 TO 500 METERS

PILOT SUPER-WASP FEATURES

One stage of S-G amplification *that tunes and amplifies!*

Two stages of audio.

14 to 500 meters with plug-in coils.

Two controls over *any* amateur band.

Completely and individually shielded.

6 v. A, 9 v. C and 135 v. B.

The finest amateur S-W set in the world.

Also a splendid broadcast receiver.

So simple, the beginner can build it.

So effective, the veteran ham cannot afford to be without it.

PILOT SUPER-WASP KIT

(Catalog No. K-110) Including 2 sets of 5 coils each, full-sized blue-print and complete assembly data.

$29.50

Slightly Higher West of the Rockies

"In my opinion no receiver manufactured today is better suited to the amateurs' 1929 need than is the Pilot Super-Wasp." R. S. KRUSE

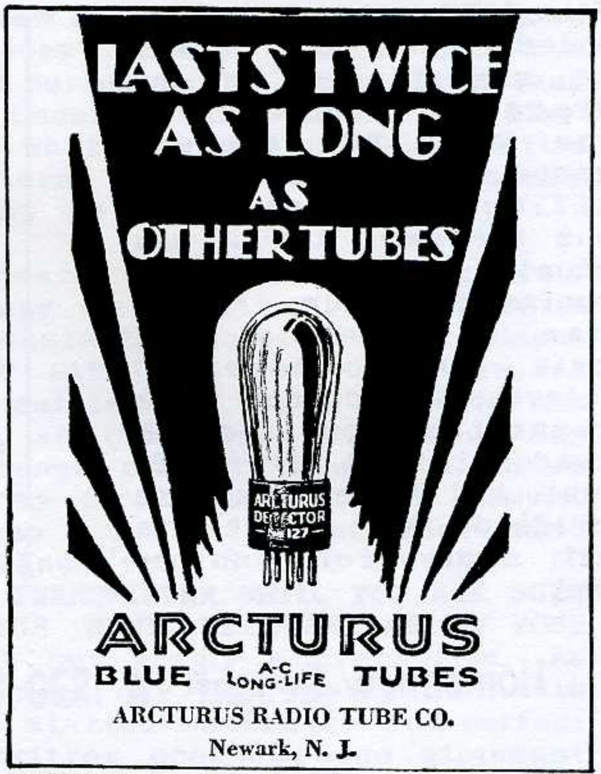
PILOT ELECTRIC M'F'G. CO INC.

323 BERRY ST. BROOKLYN, N.Y.

ESTABLISHED 1908 TRADE MARK REG.

FIGURE 2-4. Pilot's "Super Wasp" receiver kit: a hot little item covering 14 to 500 meters with romantic warmth and a beautiful glow during operation. Note use of metal plates/chassis behind front panel to minimize hand capacity. Imagine getting behind one of these classic units today...more pure exhileration than driving a 1927 Bugatti auto!!

Every amateur naturally wanted to equip his receiver with top-notch tubes, and one manufacturer stood tall in this area (See Figure 2-5). Arcturus tubes, with their high quality construction, were always good "DX getters"...a benefit everyone related to their unique blue envelopes. Indeed, substituting blue tubes in a receiver always stepped up performance. A later shortage of blue glass, however, made the going rough for Arcturus. Switch to clear glass? No way! In a desperate final move, they elected to use a blue coating over their clear glass tubes. Alas.. ..the coatings melted away after a couple of years use, carrying Arcturus' claim to fame with it. Apparently a tube by any other color was only a tube. Tisk, tisk!


LASTS TWICE AS LONG AS OTHER TUBES

ARCTURUS
DETECTOR
127

ARCTURUS

BLUE A-C LONG-LIFE TUBES

ARCTURUS RADIO TUBE CO.

Newark, N. J.

FIGURE 2-5. The genuine vacuum tube leader of the 1920s! Arcturus Tubes always pulled in the "weak ones", obviously due to their unique blue envelopes..that was until the blue started melting!

Television was also making its grand debut during the classic '20s. Yes, indeed! Electronic picture tubes were not invented until many years later, true, but that's beside the point! Nipkow mechanical scanning disks and genuine "crater tubes" turned 4 to 5 inch silhouette views with an amazing 36 to 48 lines of resolution. The disk itself has a fascinating history. Inventor Paul Nipkow received a coveted Nobel prize for his instigation of (mechanical) scanning, but it didn't actually work because fast responding neon lights were not invented until later years. Nipkow simply explained his invention was ahead of its time, and supported his theory with numerous papers.

An authentic 1920-style receiver and "televisor" combination unit is shown in Figure 2-6 (next page). It was not cheap, but it was the forefront of technology! Even experimental-minded amateurs joined the action and began exchanging their own pictures over the air! System operation was most interesting: A receiver's speaker was replaced with a crater tube which, in turn, was positioned behind the top portion of a homebrewed televisor's scanning wheel. The speed of its affixed DC motor was then varied until it attained the same speed as the (distant) transmitting disc (also DC powered). Synced motors were quite difficult to maintain, thus the main "thrill" was actually receiving a recognizable picture rather than watching a full movie. Many commercial "televisor" pictures were transmitted on the AM Broadcast band after midnight, and DX records were worldwide...but that's a full story for another time!

Living-Room Television

Hear as well as see your radio entertainment! Entertain family and friends with movies snatched out of the air. Globe Midget Type Television Receiver features:

Complete receiver and televisor combination. A. C. operation. No extras to buy. Costs no more than good radio set.

Simple to operate. Self-synchronized on A. C. system common with transmitter. No fussing.

Clear, brilliant images on 4 x 5 inch screen, entertaining up to a dozen persons. Flickerless.

Televisor includes lens disc, crater neon lamp, and silent synchronous motor.

Eight-tube receiver designed solely for best television results. Single-control tuning.

FIGURE 2-6. A combination receiver & televisor outfit of the 1920s.

Homebrew Delight: A 1920-Style QRP Transmitter

Sunspot activity and operator enthusiasm were extremely high during the 1920s. Exotic calls filled the airwaves, and every night's activity was a truly fascinating adventure. Loren Windom, 8GZ, for example, repeatedly worked South Pacific and Australian areas using a small transmitter running less than one watt.. ..INPUT! His little rig's schematic, a classic shunt-fed Hartley oscillator, with 90 volts on the plate, is shown in Figure 2-7.

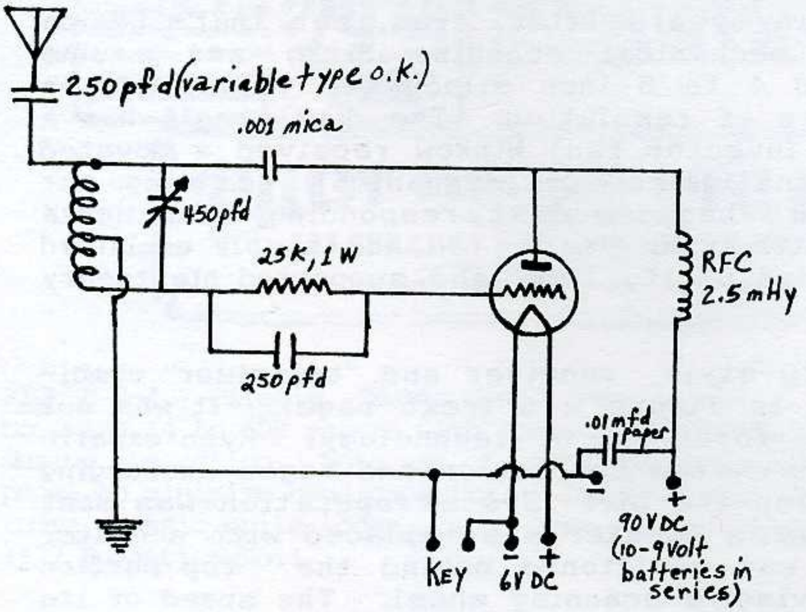


FIGURE 2-7. Authentic 1920-style QRP transmitter. Breadboard-assembled unit works as good as it looks.

Unable to resist the temptation of re-creating this gem, we assembled our own "Chinese copy" (today, that's called a "clone"), and put it on the air during early 1988. It worked right "off the bat"...and even began calling those "old-time" VKs before we could stop it! What a blast! Now the little rig is chasing DX on 30 meters! Next, it will be chasing the neighbors chickens and spooking the riff-raff!

If you wish to re-create this genuine classic (naturally!), understand that any self-excited transmitter's on-the-air signal should be constantly monitored for clean-in-band operation, and stick with 160 or 80 meters for greatest stability. This transmitter is not a modern "ham band-only unit": it will emit an impressive signal on any frequency determined by its tuned circuit (I used a random "junkbox" tuning condenser on my first version, for example, and it "wound up" tuning 4.3 to 4.6 MHz. A parallel-added 200 pfd condenser moved its range from 3.6 to 3.9 MHz). **DO NOT CONNECT AN ANTENNA TO THE TRANSMITTER UNTIL YOU ARE SURE IT IS OPERATING WITHIN AMATEUR BAND ALLOCATIONS OF YOUR LICENSE.** That's not a "scare", but simply a precaution. As we will explain later, your present-day SSB transceiver (with general coverage receiver) and station wattmeter are perfect "modern tools" for easy transmitter checkout and alignment (look ma...no grid dip meter!).

The low parts count and simple design of this transmitter make it an ideal weekend project and a great "fun rig" for occasional on-the-air use. The most challenging part of construction is locating all the necessary components. That includes heavy buss wire for interconnections (necessary for good frequency stability), Fahnestock clips (for voltage, key and antenna connections) and solid brass screws (for 1920 authenticity). A few "modern substitutions" are allowed, as we know you will keep hunting for "genuine originals" along the way. Check hamfest flea markets and magazine ad sections for type 199 or 201A tubes, breadboard sockets (tube connections are usually stamped on those sockets for easy use), "acorn" condensers, and old-style "body-end-dot color-coded resistors. The goodies are "still out there", just look close! Ten of the presently popular 9 volt "transistor radio" batteries can be "series snapped together" for providing 90 volts plate potential. You can check its "juice" by wetting one output terminal at a time, then sticking it against your friend's arm: a big jump equals a good charge! A popular 6 volt lantern battery is ideal for filament power. Add a 100 ohm 10 watt "slider pot" or resistor in series with one dry cell lead and slowly "bring up" the voltage to 5v. maximum to assure the delicate filament in this classic tube is not stressed. Do Not use AC on the 199 or 201A in this transmitter: it can produce a raspy note. Pure DC ensures a beautiful tone.

Assembly begins by laying out all parts in an eye-appealing and straight wiring manner on a small decoupage' plaque or pine board approximately 6 by 8 inches (vary size and layout so the completed unit will sit comfortably atop your favorite station accessory or fit on a wall mounting bracket. This transmitter has more glamor than five DX certificates!). A general layout guide is shown in Figure 2-8. Secure the large components with brass screws, and use "beehive standoffs" to hold the coil. If close attention is devoted to details, full assembly without a single solder connection is possible (authentic 1920!).

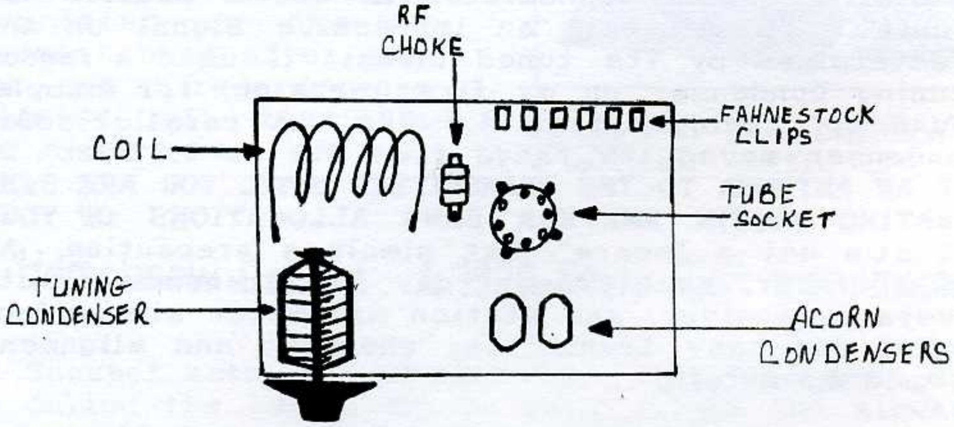


FIGURE 2-8. Layout guide for QRP transmitter shown in Figure 2-7.

Select specific tank circuit L/C values to cover a desired band, just like home experimenters did in the '20s. Basically that equates to winding a coil of "X number turns", placing an "approximately correct value" tuning condenser across the coil, then experimentally deleting/shorting turns (or padding the condenser with fixed-value condensers) until it "hits" the desired band and exhibits good bandspread. An approximate "starting point" for the 160 meter coil is 30 turns of #14 solid wire wound on an approximate 3-inch diameter form. A similar size coil with 15 or 16 turns should work good for 80 meters. I used a 7-turn 3-inch diameter coil of 1/4 inch copper tubing for 30 meters and screwed it down on the board for stability, but I'm hesitant to recommend "following my idea." Self-excited transmitters can be tricky to align and stabilize at 10.1 MHz (a 12-turn copper tubing coil, however, will work great for 80 meters)! The coil's tap position usually falls between "1/3 from the bottom" and midway on the coil. Experiment to find the exact position by moving the tap one turn at a time while monitoring RF output and signal quality on your receiver.

The tuning condenser should be a large 450 pfd "transmitting type" with wide spacing between plates. Small broadcast radio-types will probably arc-over or "zap" their rinky-dink padders. If you only have a 200 or 250 pfd variable, add a transmitting type fixed condenser in parallel with it to equal 450 pfd total capacitance. If your variable is too large or if greater bandspread is desired, remove a few plates! Use long nose pliers to wiggle loose and pull plates "dentist style" from both rotor and stator sections, and check frequency ranges after each "plate pulling". Diligent efforts here can yield a beautiful tuning rig.

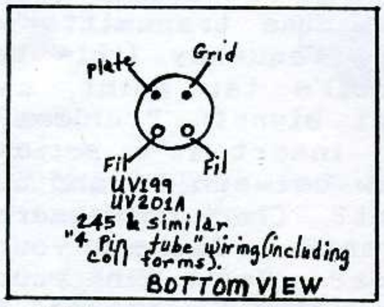
After final assembly of the classic QRP transmitter, use your trusty voltohm meter to double check all circuit connections for continuity. You should read zero ohms between the H.V. Fahnestone clip and the tube socket's plate pin, for example, and 25K ohms from the socket's grid pin to the .001 mica's "tank connection side". Next, apply filament voltage, connect your wattmeter and dummy load between the transmitter's antenna and ground connections. Wait a few minutes, then tap brief dits on the key while noting wattmeter readings (confirming that RF is being produced) and "hunting its signal" on your general coverage receiver. Then decide whether to add coil turns to lower the transmitter's frequency or reduce turns to raise the frequency (this is also a good time to "fine tune" the coil's tap point, as indicated by maximum output and cleanest signal). Problems? Set your VOM on its current scale and insert it in series with the B plus lead. The rig should draw between 20 and 60 ma. during proper operation. High current? Check condensers (and your wiring)for shorts. No current? Recheck your work...what wire did you forget to include? Can't "find your signal?" Use an older receiver...the type that "swooshes" 3 to 7 MHz in a half-dial turn...then "fine tune" with its bandspread. Alternately, set your (modern) receiver on one frequency and "swoosh" the transmitter's condenser until spotting its signal (do not connect an antenna to your receiver during this test, and the nearby transmitter's signal will "stand out like a sore thumb"). Additional notes on self-excited transmitters are included in Chapter Three's discussion of homebrewing "big Hartleys". Please read those pages for more guidance.

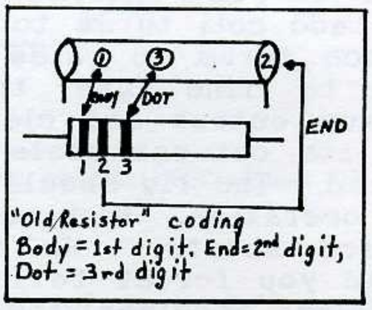
After getting the QRPer working on amateur frequencies, you will surely be anxious to put it on the air. Great! Simply remember, this little gem is not crystal controlled, its keying is hard, and it is rich in harmonics. Use a monoband antenna like a dipole or inverted L, add a .01 mfd condenser across the key to reduce clicks, and place the transmitter and key on separate supports/desks for vibration-isolation. We also encourage continuously monitoring its signal for stability. That's why we are starting off with

QRP: it does not promote massive interference. You can enjoy nostalgic fun supreme without offending others. Make no mistake, however, numerous exciting QSOs are possible with this little gem. A variety of other transmitter circuits could have been included in the 1920s chapter, but we are trying to keep things simple and easy to build...even if you've never assembled a rig. Type UX199 and 201A tubes are fairly common today compared to other vintage types. Our highlighted circuit fits beautifully on a small wood board. You can put it into the smallest desk or wall space. It is a sure-fire way to convey our proud heritage to future generations. Enjoy!

A Matching 1920-Style Receiver

You will naturally want to assemble a mating receiver for the previously described transmitter, and the little gem shown in Figure 2-9 "fills that bill." It can even be constructed on an identical size wood base with similar tube sockets, resistors and tuning knobs...twins!





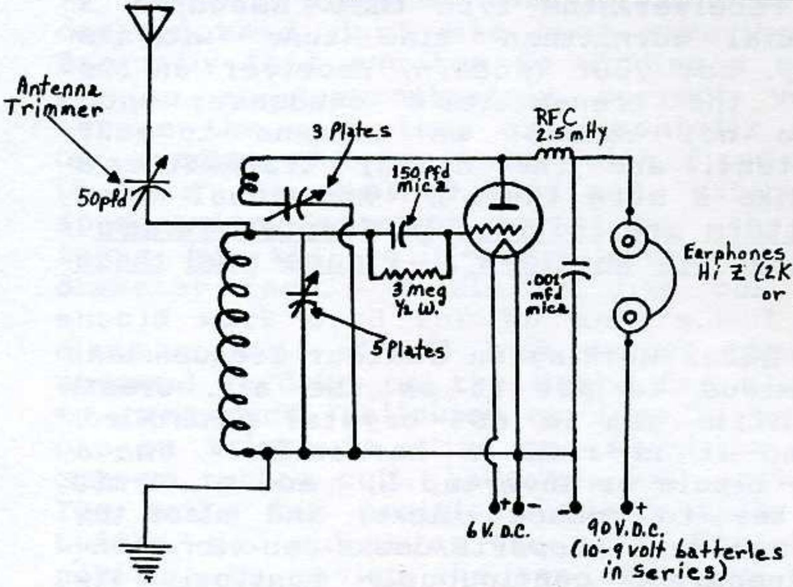


FIGURE 2-9. 1920-style receiver is assembled on a small pine board to compliment its mating transmitter.

Because the general concepts of locating original-era parts and breadboarding equipment were included in the previous QRP transmitter's discussion, we will move forward with a slightly faster explanation of the receiver. This one-tube regenerative marvel may not burn up the bands with DX reception, but it's surprisingly sensitive for its "basic design." It is also capable of fairly good SSB/CW reception on today's amateur bands except for "barn door wide" selectivity. The beauty of self-assembling one of these little wonders is simplicity: it is a dandy weekend project after you've secured all the components. Need more incentive? Imagine working your friends on 80 or 160 meters while using a one-tube transmitter and one-tube receiver, describing it, and then displaying it at a local club meet. Sheer nostalgic bliss! Vacuum tubes have a special inner beauty and warmth that simply can't be equalled by today's cool and impersonal transistors (reminds you of old girl friends, eh?).

"Low loss" were the big words in receiver designs of the 1920s. Detectors were loosely coupled to the antenna system and every imaginable measure was used to ensure all available incoming signal strength was retained. Coils were often wound "Lorenz style" by weaving stiff wire between wooden pegs to minimize losses. Our 1920-style receiver reflects many of those noteworthy criteria, however we will leave the choice of "open air/Lorenz" or form-wound coils to your personal discretion and patience limitations. Your easiest route here is to pick up a few prewound commercially-made coils by Bud, Hammarlund or National at a hamfest flea market. The coils with wide spacing between turns are usually for "ham bands." Mate them with typically-utilized 100 pfd tuning condensers of the '20s, and Bingo! You're ready for action...no muss, no fuss. Likewise, winding your own coils on standard 1 1/2 inch forms usually results in mere "homemade copies of commercial equivalents." Realizing this "common denominator", specific form-wound coil data for our 1920-style receiver is included in Chapter Three's Receiver Table for space conservation. If you really want to go "1920 style" with this gem, try your hand at Lorenz-wound coils. They're fun! The coils are wound by carefully weaving stiff cloth (or plastic) covered solid wire through a homemade jig of wooden pegs (see Figure 2-10 on next page). In fact, the small pegs can be glued in place on your receiver's board (before other parts are added) and used as a winding jig. If you get "carried away", add Lorenz coils in your 1920 transmitter! The receiver's 3-inch tall pegs should be spaced for an approximate coil diameter of 1 1/2 inches. Use number 16 or 18 wire for good rigidity, and wind roughly 3/4 the number of turns shown in Chapter Three's Receiver Table. You'll need to "trim and tinker" for ham band reception, but we have some clever modern ideas to help you.

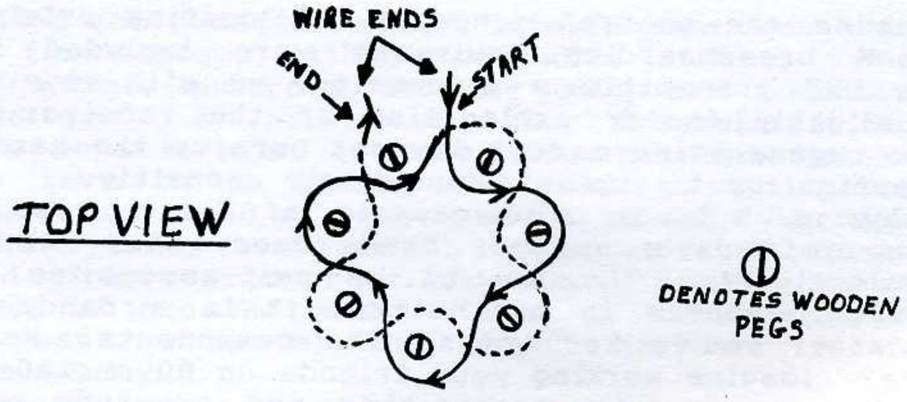


FIGURE 2-10. Method of winding Lorenz coils. Stiff wire is weaved between wooden pegs mounted upright on breadboard. Follow solid wires for one turn, dotted lines for next turn, then alternate. Bind coils with string before removing. Vary coupling between windings by manually changing their spacing.

When using standard form-wound coils, the receiver's tuning and regeneration condensers are regular 100 pfd and 20 pfd variables. If you pursue the "serious 1920 and Lorenz concept", condensers are measured in plate counts. That's 5 plates on the tuner and 3 or 4 plates on the Reinartz regeneration. Say your junk box condenser has 16 plates? No problem! Use your needlenose pliers to wiggle loose and pull plates "dentist style" until only 4 or 5 stator and 4 or 5 rotor plates remain. If you have trouble "pulling plates", change to a condenser with wider spacing and/or screw construction. Original capacity isn't important here, because you will still need to trim the coil for alignment (and you'll have good bandspread). You can also delete the regeneration condenser if you use Lorenz coils. Shift the RFC's connection from the tube's plate to the tickler coil's top (as seen on the schematic), remove the ground, and connect the tickler's bottom wire to only the tube's plate. Regeneration is then adjusted by varying tickler-to-main coil winding. Be sure both coil windings are in the same direction (wound clockwise as seen from the top of their form, for example), otherwise sensitivity will be degraded. If the finished receiver fails to regenerate or break into oscillation for CW copy, reverse connections on the plate/tickler winding.

Take a look back at the Pilot Super Wasp receiver shown in Figure 2-4. If you have trouble with hand capacity, try adding their idea of metal plates behind the tuning and regeneration controls. I'm sure Pilot won't object to "copying ideas" at this later date. If preferred, the 50 pfd

antenna coupling condenser can be home-fabricated by tightly twisting two insulated wires together in an approximate 2 inch length. **Trim the twisted wires or capacitor the exact** length with cutters until good reception, **without overload,** is achieved.

The earphones are old-time high-resistance type (2000 ohms or higher). **DO NOT** use modern (low impedance) earphones! Notice these 'phones are the tube's plate load, and the higher their impedance, the greater voltage (signal) developed across the earphones. Impedance matching transformers? Banish such evil thoughts! Remember our prime considerations mentioned earlier: "low loss." Transformers introduce loss, and "one tubers" simply don't have excess to spare!

Several types of medium impedance triodes can be used in this receiver, but the best bet is a genuine UV200 tube. Don't panic if you can't find a 200; a UV201A or UV199 will work very well. Either way, strive for a collection of several receiver tubes so you can "hand pick" the most sensitive one for best DXing. Watch those preused ones, however. Many of them are literally filled with nostalgia. We put one in our receiver and it continued playing that old-time razzma-tazz music of the '20s for nearly a week before all the cobwebs cleared and it began receiving present-day CW signals. Say Hallelujah! Why, one friend used an imported valve (tube) in his 1920 receiver and it continued speaking German almost three days! Would we jest?

Initial alignment of the little receiver involves adjusting regeneration until the set breaks into (headphone) oscillation, then tuning in its signal on a nearby modern transceiver with general coverage reception (these classic 'regens emit a CW signal on their receive frequency: A "tell tale" clue to their operation). Connect a 15 or 20 foot wire to the 1920 receiver's antenna terminal during this test, and lay it on your shack's floor. Do not connect an antenna to your modern transceiver. These measures will make it easy to spot the 1920 rig's signal on your transceiver. Look for the strongest S reading. Next, trim the coil and/or pad the tuning condenser and note "which way" the receiver's tuning range is moved. When you're satisfied with the results, calibrate the (1920) receiver's "0 to 100" dial marks by spotted frequencies on your general coverage transceiver. Simple, clever, no Grid Dipper needed, and circuit wiring was also considered. Finally, connect a short (40 to 50 foot) antenna like our 4-wire cage in Figure 2-11 to the 'Regen receiver. Set its regeneration right at the point of oscillation and enjoy 1920 style DXing! **Add a genuine Vibroplex or Boulter bug to the mating QRP transmitter, and you have a complete 1925 setup every true amateur will envy!**

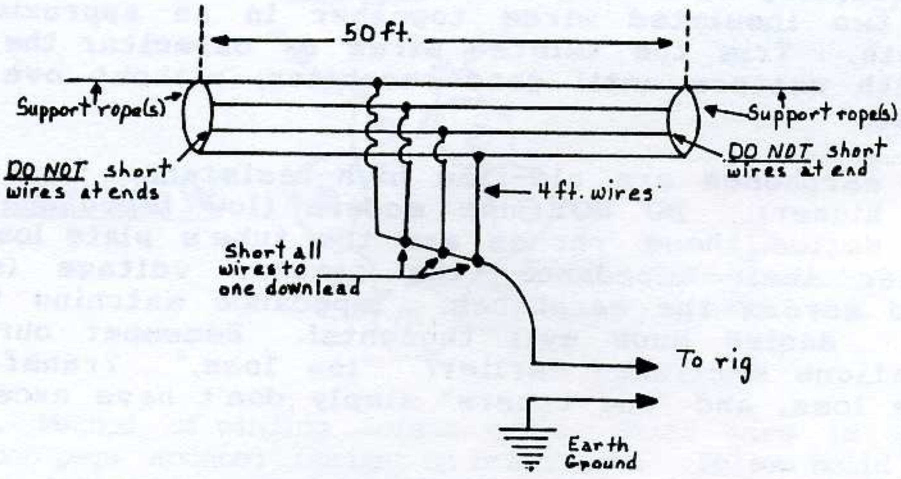

50 ft.
Support rope(s)
Support rope(s)
DO NOT short wires at ends
DO NOT short wires at end
4 ft. wires
Short all wires to one downlead
To rig
Earth Ground

FIGURE 2-11. Classic four-wire flattop antenna. This non-resonant design is ideal for 'Regen receiver use, as it prevents "suck out" of signals at the antenna's tuned frequency. Design was also popular for transmitting during the '20s.

Operating vintage gear and using QRP typically requires a bit of adjustment, so here are some "getting started" hints; after you "get the feel" you can drop these "temporary crutches." 1) Initially, use your modern transceiver for frequency guidance. After tuning in a CQer, disconnect the transceiver's antenna and "zero" the vintage receiver (by its regenerative howl). Then send a series of dits and "zero" the vintage transmitter on that same frequency. 2) A battery-powered digital frequency counter can also be used as a frequency-tuning guide for the vintage receiver, then its plate voltage can be removed and the transmitter keyed to "zero" that same frequency. 3) Locate transmit and receive antennas at least 50 feet apart, and orientate them at right angles for minimizing regenerative receiver overload. 4) Remember QRP signals are usually weak. Call others (preferably those with strong signals) rather than calling your own CQs: The success ratio is higher. Remember, also, patience and persistence are a QRPer's greatest virtues. Enjoy!

Want to have some real fun with your 1920-style rig? Each winter the Antique Wireless Association, P. O. Box E, Breesport, New York 14816 sponsors a unique old-time on-the-air contest. Operators use only 1920 to 1929-era equipment of less than 10 watts, and the main band of action is 80 meters. Some of the signals are really beautiful, some are comical, and all are unique. It is a super event! Contact the Antique Wireless Association directly for full details on their contests and other activities. 1920-style amateur radio is indeed alive and well in 1988!

CHAPTER THREE

ROMANTIC RIGS & RECOLLECTIONS OF THE 1930s

The 1930s were truly amateur radio's most romantic and golden age of evolution. AC power sources began replacing batteries and home generators, crystal frequency control gained precedence over self-excited oscillators, bakelite front panels with "velvet Vernier" dials became homebrew favorites, and hefty transmitting tubes like the Taylor T-55 and the 203A "50 watter" acquired widespread popularity. The T-55 was especially interesting, as it "bridged a gap" between the classic 10 or UV210 of '20s fame and the 807 of '40s notoriety. Its "modern equivalent" is probably the 811, which is now being obsoleted by the 3-500Z (notice, also, the progressive increase in power ratings). The decade began with late 1920 open air-style battery setups and ended with fully cabineted rigs and superhetrodyne receivers reflecting state-of-the-art technology.

The great depression and its crippled national economy initially inspired many young men with more time than money to investigate amateur radio (a popular spin-off of the 1920s AM Broadcast listening craze). Using defunct battery sets acquired free for the asking from local radio repair shops, along with a liberal amount of personal ingenuity, a clever chap could put together an impressive 10 watt DX setup for mere pennies. The bands were booming with DX action...India, China, Liberia, Australia, and many, many other areas "rolled in" on homebrewed 2-tube regenerative receivers with phenomenal signal strength. It was an amateur's delight!

As the country's economy recovered, amateur radio really flourished. Commercially manufactured equipment with attractive price tags were produced by upcoming companies like National, Hammarlund, Hallicrafters, McMurdo-Silver, Gross, and many more. "Store-bought" receivers teamed with home assembled transmitters and antennas quickly became popular setups of the era. Commercially manufactured quartz crystals began replacing their previous home-ground counterparts. As superhetrodyne receivers moved into vogue the term "Single Signal Reception" began replacing the previous era's favorite nomenclature of "Low Loss Design" (comparatively, today's popular term is "High Performance" or "DX Deluxe").

A forerunner in "Single Signal Reception" was Hammarlund's "Comet Pro" featuring a genuine quartz crystal filter (see Figure 3-1).

SINGLE-SIGNAL RECEPTION • COMET "PRO"

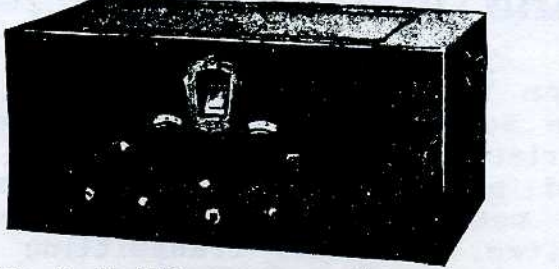


FIGURE 3-1. Hammarlund's Classic Comet Pro Receiver: Single Signal Reception and a genuine crystal filter.

A New Model Uses an Improved

CRYSTAL FILTER

HAMMARLUND'S interpretation of "Single-Signal" reception with a crystal filter is unique.

Characteristically thorough, Hammarlund has not rushed blindly into premature enthusiasm. It has required time and care to perfect the application of a quartz crystal to so excellent a receiver as the COMET "PRO," without losing more efficiency than is gained.

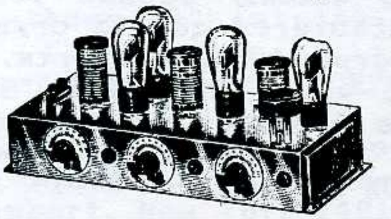
Now, it is here — the famous COMET "PRO," *retaining all of its former desirable features* — PLUS 100 PERCENT OF CRYSTAL SELECTIVITY.

A flip of a switch on the front panel instantly converts the *standard* "Pro" to the *crystal* "Pro." Another front-panel control varies the response characteristics of the crystal filter, *without detuning the circuit or reducing efficiency in any respect.*

If you wanted a kit transmitter to go with it, Gross Radio's 20-watt "Jr." shown in Figure 3-2 was a popular choice. Imagine: a 47 oscillator, 46 buffer and dual 46 finals, on a metal chassis, no less, for only 10.95! Budget-minded amateurs, however, usually mated the "Jr." with a lower cost SW-3 or Hallicrafter "Sky Buddy" and a quarter wave Marconi antenna.

TYPICAL GROSS VALUES!!

THE NEW "20-W JR." Crystal Controlled Transmitter Kit, $10.95



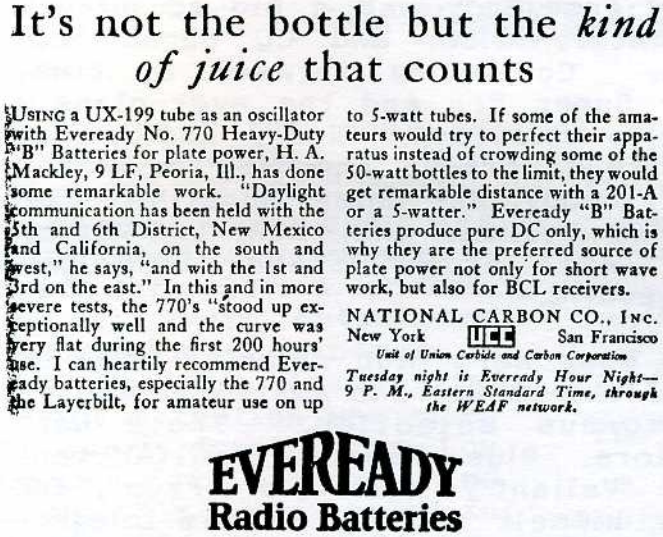
This efficient little transmitter is very low priced, making it possible for anyone to use crystal control at less than it would cost you to get the parts together for a self excited rig of this type. The "20-W Jr." is simple to wire and get on the air and the most inexperienced operator will have success with it. The size of the transmitter is only 6" x 17" and is therefore suitable for portable use. Only one milliammeter is required for tuning the transmitter and jacks are provided for this purpose, for each stage. The plug-in crystal holder is supplied with the kit at no additional cost. The "20-W Jr." uses one '47 as crystal oscillator, one '46 as buffer or doubler and two '46's in the amplifier. One set of three coils is supplied with the kit for either 20, 40, or 80 meters, 50 cents extra for the set of 160 meter coils. When ordering mention your choice of coils.

80 or 160 meter X cut crystals supplied for only $2.75 if purchased with the "20-W Jr." kit. Hoyt milliammeter if purchased with the kit, only $1.25.

Power Supply Kit, $6.95.

FIGURE 3-2. Gross Radio's economic 20 watt transmitter kit complete with...get this...metal chassis. Professional and beautiful!

If you were still on the juice (using battery power, that is) Eveready's ads like Figure 3-3 were a real inspiration for beating out the big bottle boys.



It's not the bottle but the *kind of juice* that counts

USING a UX-199 tube as an oscillator with Eveready No. 770 Heavy-Duty "B" Batteries for plate power, H. A. Mackley, 9 LF, Peoria, Ill., has done some remarkable work. "Daylight communication has been held with the 5th and 6th District, New Mexico and California, on the south and west," he says, "and with the 1st and 3rd on the east." In this and in more severe tests, the 770's "stood up exceptionally well and the curve was very flat during the first 200 hours' use. I can heartily recommend Eveready batteries, especially the 770 and the Layerbilt, for amateur use on up to 5-watt tubes. If some of the amateurs would try to perfect their apparatus instead of crowding some of the 50-watt bottles to the limit, they would get remarkable distance with a 201-A or a 5-watter." Eveready "B" Batteries produce pure DC only, which is why they are the preferred source of plate power not only for short wave work, but also for BCL receivers.

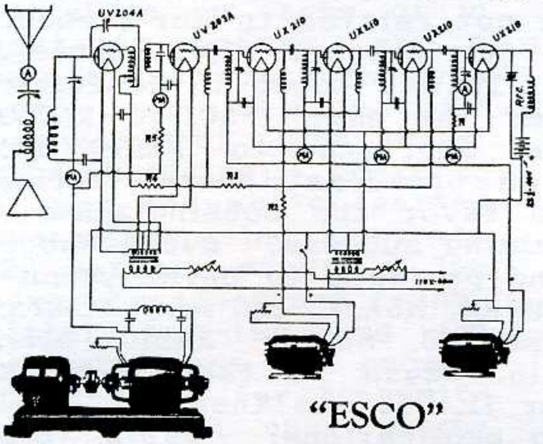
NATIONAL CARBON CO., INC.
New York UCC San Francisco
Unit of Union Carbide and Carbon Corporation

Tuesday night is Eveready Hour Night—9 P. M., Eastern Standard Time, through the WEAF network.

EVEREADY
Radio Batteries

FIGURE 3-3. The benefits of QRP over QRO were real points to get "sauced up" over in the 1930s, and this Eveready ad really "drove home" the point!

If a tractor motor-powered big transmitter caught your fancy, ESCO's setup in Figure 3-4 inspired your thoughts. A group of hefty DC generators supply high voltage for this "battle cruiser" that's obviously a farm boy's delight. Now let's see...we need a half dozen fan belts, three pulleys, the model T's engine, and...ah yes...a beautiful era indeed!



"ESCO"

This set requires a UX210 oscillator, three UX210 frequency doublers of the UX210 type, a 203-A power amplifier and a 204-A power amplifier. The crystal is a 320 meter one for 40 meter operation or a 160 for 20 meter work. Filament supply comes from two filament transformers, one for the 210s and another tapped for 11 and 13 volts for the 203-A and 204-A tubes. Plate supply for the 210s is obtained from Item 8, a resistance in the plate circuit of the oscillator tube producing the necessary IR drop to supply the tube with only 300 volts. Plate supply for the 203-A and 204-A tubes is obtained from Item 22, resistance R5 supplying the drop, allowing 1000 volts to be used on the 203-A. Grid bias for the tubes is obtained from Item 4 with IR drop resistences in those circuits requiring less than 400 volts. The grid bias for the oscillator tube comes from a block of B battery.

FIGURE 3-4. ESCO's "build 'em" schematic for a farm boy's delight. Look close at this rig: it is a big-time, high power job guaranteed to zap those wimpy 5-watters!

Meanwhile, the "big city boys" were working the world with new fangled superhet receivers and push-pull "50 watter" tubes. There were even a few stable VFOs being used for returning to DX close to their frequency (many DX stations transmitted outside U.S. allocations, then tuned the band for calls. Being close to their frequency was a big advantage). ARRL announced the DX Century Club, and CQ began their elaborate awards programs. Continuing forward in time, Hammarlund introduced their Super Pro and the ever-classic 6L6-807 transmitter came into existence. Henry Radio, then based in Butler, Missouri offered trades and time payments on such favorites as the Sky Buddy, Sky Chief, Super Skyrider and Super Pro receivers, and Collins, RME, RCA, and Harvey Wells transmitters. The "mail order" trend (less toll free/800 numbers!) started to evolve.

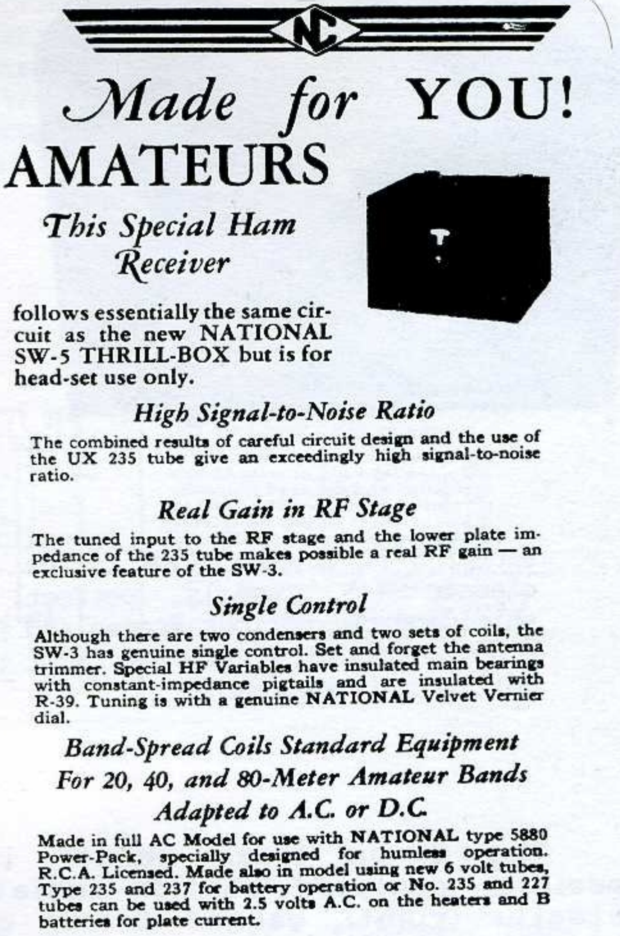
Semi automatic keys, or bugs were high priority items on every amateur's want list of the 1930s, and amateur magazines always advertised a glamorous selection. There were Vibroplex "Standards", Juniors, Blue Racers, Boulter bent keys, Speed-X, Mellihand's "Valiant", McElroy's "Pros", and many more. Ted R. McElroy himself set the world's telegraphic record of 77 Words Per Minute in 1937: an achievement that remains a record to this date. See Chapter Five for more details on those beautiful old bugs.

Amateur radio magazines also realized an all time high in popularity during the 1930s, with "THE TRANSMITTER", "R/9", "RADIO", "AMATEUR RADIO", "MIDWEST RADIO", and "QST" gracing station desks nationwide. Two other very popular magazines were "CQ" and "73", but they were not related to our present magazines bearing those names. Our present "CQ", however, has a most interesting history. It was begun in California during the spark era (1917) under the name "PACIFIC RADIO NEWS". During the 1920s, it was shortened to "RADIO" and changed format to support the AM Broadcast craze. During 1933, "RADIO" switched format to favor the booming amateur radio market, and was an overwhelming success. Every issue was packed with exciting ideas and projects to build, compliments of such notables as W1QP, W6AM, W6AJF, and many others. During 1937, "R/9" and "RADIO" merged, making "RADIO" even more popular. "RADIO" grew thin, began to fade and was almost destroyed during World War II. It was then sold, and the new owners split it into two publications: "AUDIO" and "RADIO". After the war, owners Potts and Cowan rebuilt the pieces and renamed it "CQ". The magazine, then moved to New York, boasted top name editors and contributors like W2IOP, W9EGQ, KV4AA, W2NSD, W6SAI and W3ASK (how many following names can you mate with those calls: Spencer, Kaishman, Brier, Green, Orr, Jacobs). During later times, present owners Dick Ross and Al Dorhoffer purchased CQ from Cowan and moved it to the forefront of amateur radio magazines. A few years later, your author also joined the celebrated staff of CQ writers...a favorite privilege I hope continues for life. There's simply no pursuit, hobby or service even remotely comparable to amateur radio. It's great! What a blast!

The Classic National SW-3

Surely the most popular and economically attractive amateur receiver of the early 1930s was National's classic SW-3 "Thrill Box" shown in Figure 3-5. This three tube regenerative gem was advertised and manufactured for over a decade, and it truly established National's prominence in the amateur fraternity. Strict attention was given to every detail, from Low Loss coil forms and adjustable tuning rates to efficient interstage shielding and wide tube type interchangeability.

SW-3s were used with their mating "AB" AC supply by amateurs in cities, operated directly from batteries on farms or in portable setups, and a select few amateurs even used them mobile in their early autos! The latter pursuit typically centered around non-motion/parked operation using separate "B" battery power, a low power-breadboarded transmitter, and two long wire antennas (one for receiving and one for transmitting) thrown over nearby trees.



Made for YOU!
AMATEURS

This Special Ham Receiver

follows essentially the same circuit as the new NATIONAL SW-5 THRILL-BOX but is for head-set use only.

High Signal-to-Noise Ratio

The combined results of careful circuit design and the use of the UX 235 tube give an exceedingly high signal-to-noise ratio.

Real Gain in RF Stage

The tuned input to the RF stage and the lower plate impedance of the 235 tube makes possible a real RF gain — an exclusive feature of the SW-3.

Single Control

Although there are two condensers and two sets of coils, the SW-3 has genuine single control. Set and forget the antenna trimmer. Special HF Variables have insulated main bearings with constant-impedance pigtails and are insulated with R-39. Tuning is with a genuine NATIONAL Velvet Vernier dial.

Band-Spread Coils Standard Equipment
For 20, 40, and 80-Meter Amateur Bands
Adapted to A.C. or D.C.

Made in full AC Model for use with NATIONAL type 5880 Power-Pack, specially designed for humless operation. R.C.A. Licensed. Made also in model using new 6 volt tubes, Type 235 and 237 for battery operation or No. 235 and 227 tubes can be used with 2.5 volts A.C. on the heaters and B batteries for plate current.

FIGURE 3-5. National's 1934 ad highlighting the ever-popular SW-3 receiver.

A front view of the classic SW-3 is shown in Figure 3-6. The left control adjusts the RF trimmer capacitor, and is used in conjunction with the right side regeneration control to establish the proper operating points for AM or CW reception. A genuine "Velvet Vernier" dial, backlit with a small pilot lamp and calibrated 0 to 100 graces the panel's center for tuning. Notice the small chrome ball right above the tuning knob. It "clicks" from right to left and adjusts the tuning speed of the dial. A thumbwheel control directly below the tuning knob adjusts RF gain. It's marked in S units from 1 to 9, and the manual explains how it can be used to measure incoming signal strengths. The left on/off switch and right earphone jack were added by your author to fill holes left by a previous owner.

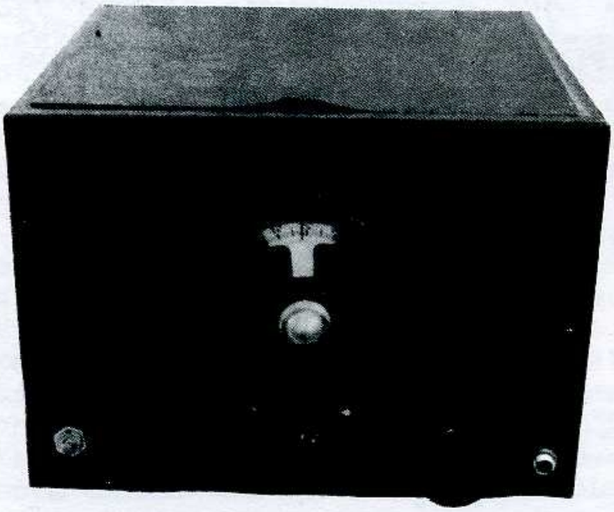


FIGURE 3-6. A direct front panel view of National's SW-3 receiver with its black-on-black knobs and panel. Three tube regenerative design, and a real DX-getter.

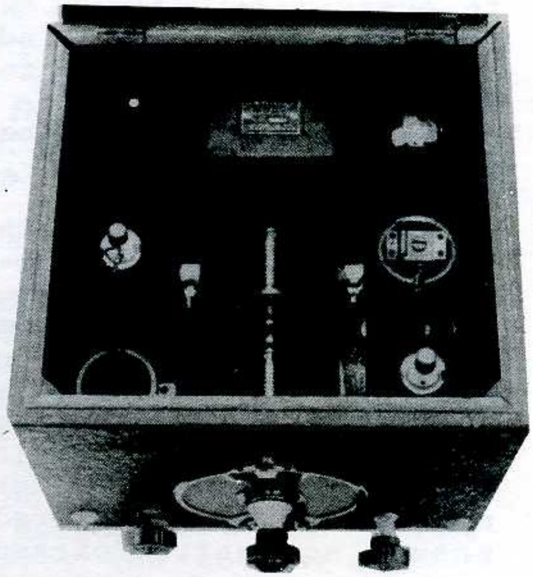


FIGURE 3-7. Inside view of the classic SW-3 reveals perfect shielding of various stages and plug-in coils. Trimmer on right coil sets bandspread.

The SW-3s inner beauty is revealed in Figure 3-7. Specially designed shields isolate the RF amplifier (left), detector (right), gauged tuning capacitor (middle), and audio (rear) stages. Bandspread detector coils include a built-in grid leak and trimmer capacitor. A separate grid leak and grid cap connector is mounted in the section for use with general coverage coils. The center rear item is National's highly commended 700Hy audio choke, and the left rear shaft switches filament wirings for AC or DC operation. Beautiful indeed! Looking into this gem is just like tripping back into the roaring 30s. If you can find one of these classic rigs today, go for it! After restoration, an SW-3 "Thrill Box" is a glamorous and impressive performer on today's bands.

The SW-3's versatile schematic diagram is shown in Figure 3-8. At least six tube sets and a variety of plug-in coils can be installed, according to desired frequency coverage and filament operating voltage. Popular tube types are listed below for your restoring or reading pleasure. Beyond this point, you're "on your own". Enjoy, Enjoy.

ACSW-3 PARTS LIST

C_1 — *Dual variable air capacitor, 90 mmf. per section.*
C_2 — *Part of C_1, ganged.*
C_3 — *Variable air capacitor, 50 mmf.*
C_4 — *.00025-mfd. mica capacitor.*
C_5 — *.01-mfd. mica capacitor.*
C_6 — *.5-mfd., 200-volt paper capacitor.*
C_7 — *.0001-mfd. mica capacitor.*
L_1 — *R.F. amplifier transformer.*
L_2 — *Detector transformer.*
L_7 — *2.5-m.h. R.F. choke.*
L_8 — *5.5-m.h. R.F. choke.*
L_9 — *700-henry choke — part of coupler.*
R_1 — *10,000-ohm rheostat.*
R_2 — *300-ohm, ½-watt resistor.*
R_3 — *5-megohm, 1-watt resistor.*
R_4 — *2000-ohm, 1-watt resistor.*
R_5 — *50,000-ohm potentiometer.*
R_6 — *.25-megohm, ½-watt resistor — part of coupler.*
R_7 — *12,000-ohm voltage divider resistor — 3100, 2000, 6900-ohm sections.*

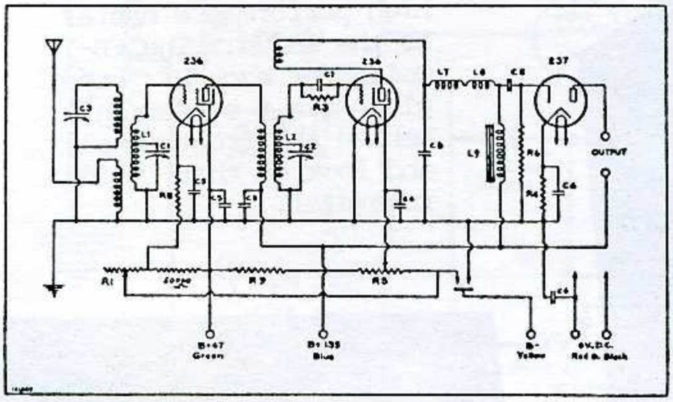


FIGURE 3-8. The National SW-3's circuit diagram. Similarity between this unit, homebrew equivalents and receivers presented in numerous QST/R9/RADIO magazines of the '30s was amazing. Indeed, this concept was the "way it was done." Some used RF amplifier stages, some did not.

6V DCSW-3 PARTS LIST

The circuit diagram shows types 36 and 37 tubes in place for 6-volt DC operation. By simply substituting type 35 for type 36 and type 27 for type 37, the receiver may be converted to 2.5-volt AC operation, without circuit or coil changes. Circuit constants are identical with those applying to DWG. No. 5 with the following exceptions:
R_8 — *350-ohm, ½-watt resistor.*
R_9 — *20,000-ohm, 2-watt resistor.*

	RF AMPLIFIER	DETECTOR	AUDIO AMP	FILAMENT VOLTAGE	PLATE VOLTAGE
TUBE TYPES	35	35 (or 24)	27	2.5 V	67-135 V
	32	32	30	2.0 V	67-135 V
	36	36	37	6.3 V	135 V
	58	58	27	2.5 V	135 V
"UNIVERSAL"	1N5	1N5	1A5	1.5 V	90 V
MODEL SW-3	6J7	6J7	6C5	6.3 V	135 V

TABLE 3-1. Tube types for the National SW-3 Receiver.

The National FB-7 Receiver

National's less known yet quite high performance receiver manufactured during the 1930s was the FB-7 shown in Figure 3-9. The unit employs plug-in coils to cover roughly 3000 through 10 meters, and bandspread coils really make that sliderule tuning an amateur's delight. The front chart indicates approximate tuning ranges. Figure 3-10's inside view reveals an impressive 6-tube layout with ganged tuning condenser and plenty of shields to minimize stray coupling. Notice the turrent-type assembly for coils with direct leads to tube grids. Talk about going first class! Imagine sliding behind one of these gems today, firing up your mating "50 watter" transmitter and tapping out a few CQs with one of Vibroplex's green-based bugs. Life just doesn't get any better, gang! Ask Doug Reid, W7TP, owner of the FB-7 in these photos. He uses it on the air and loves it. Congratulations, Doug.

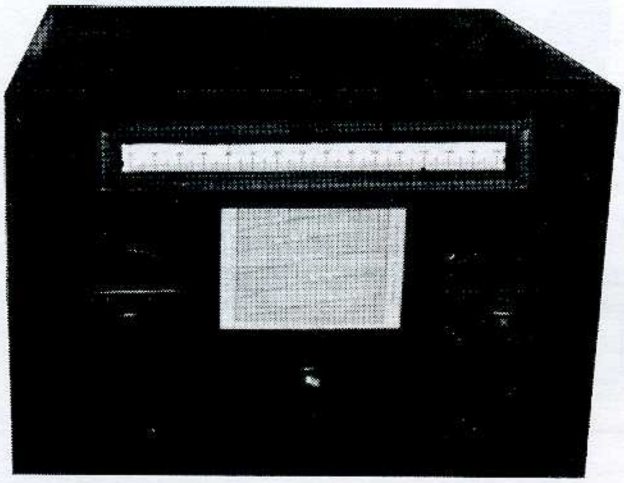


FIGURE 3-9. National's high performance master of the 1930s: The FB-7. Coils for each HF band plug into turrents behind the front panel, and look at that slide rule dial.

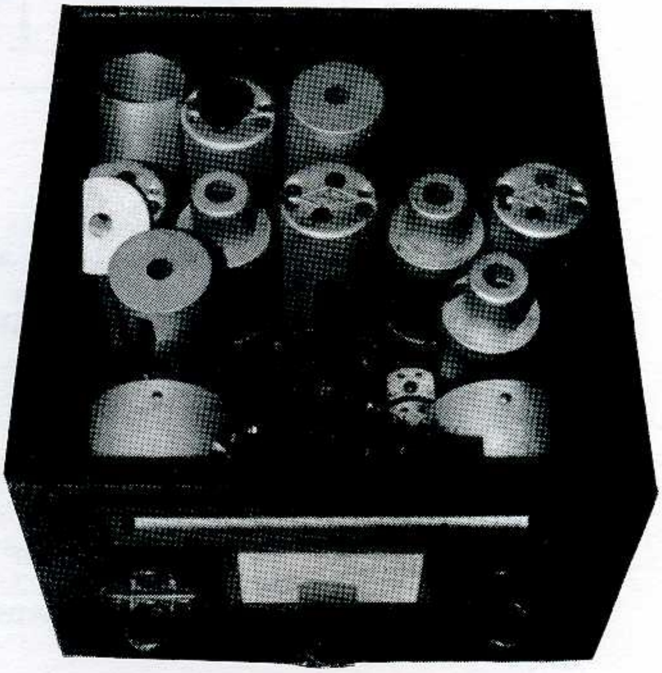


FIGURE 3-10. Inside view of the FB-7 reveals extensive use of tube shields and turrents for front panel-accessed coils. Photo courtesy of W7TP.

The "Big H": A 1930-Style Transmitter

As previously highlighted, the 1930s were a period of sheer romance and excitement in the world of amateur radio. Transmitters of both single and multiple tube design were popular, some were self-excited, others were crystal controlled, and some were battery powered, while still others were operated from AC supplies. Newly implemented Federal Radio Commission regulations, however, stipulated all signals should exhibit a well-filtered/pure tone and be stable in frequency. Each of those very important factors were carefully considered when planning this chapter's construction projects. We also considered present day parts availability, the brief amount of time today's amateurs invest in single projects, and "zeroed in" on three unique transmitters. Our first gem is shown in Figure 3-11.

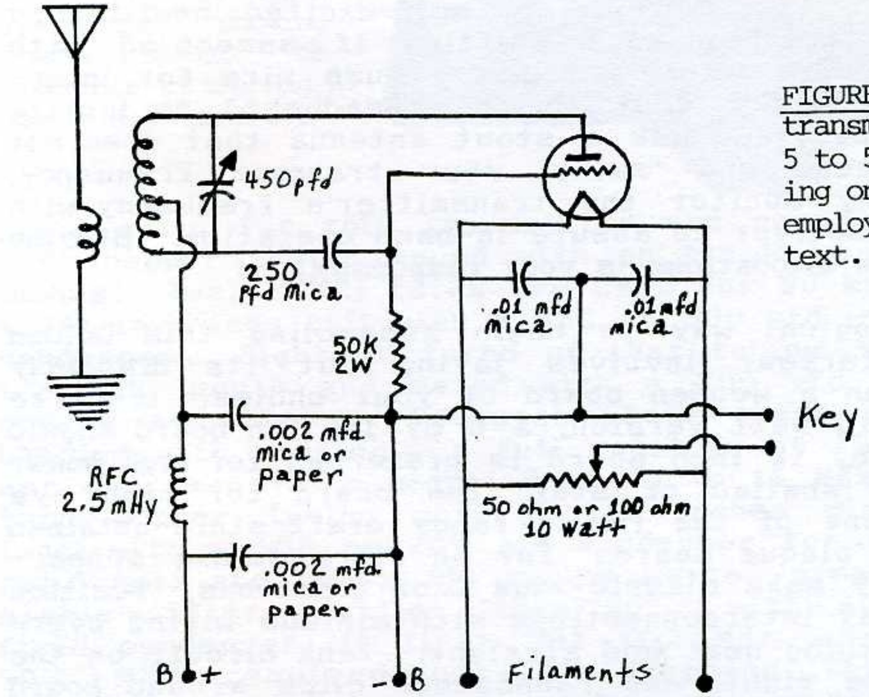


FIGURE 3-11. The Big H transmitter. Unit runs 5 to 50 watts, depending on tube and voltages employed. Discussion in text.

This classic work of art is truly the "Mona Lisa of amateur radio." Yes indeed! It adds untold beauty and warmth to any desk corner or wall shelf it graces, and you can have one of the genuine articles right in your own home! We're talking big time ham radio, gang: 500 volts DC...not that wimpy 12 volt stuff, no high SWR shutdown (it even works with the antenna disconnected) and several amps of RF current in the tank circuit (just grab the coil while transmitting... you'll see!). Whew!

The "Big H" can be assembled using small parts and a medium duty tube to run from 5 to 30 watts input, or high power enthusiasts can use larger parts and a big "50 watter" tube for serious DXing. A number 45 or 245 tube operating with 180 volts and 30ma runs 5 watts; increasing that to 300 volts with 50ma gives 15 watts. A number 10 or 210 tube works good with 500 to 700 volts for 20 to 30 watts input, and a larger based 203 with 1,000 volts on its plate runs a solid 50 watts input. In fact, almost any transmitting grade triode can be used with very good results. I've substituted a T-20, a 211A, a 75TL and several other tubes with great success, although the 75TL melted its "light duty" plate lead! Stay alert that circulating RF currents require heavy/tightened bolts, high voltage flashes over close-spaced tuning condensers, and pick your parts accordingly! You'll surely assemble the rig "open air style", so stay keenly alert to exposed potentials (especially if you've been spoiled by modern, fully enclosed solid state transceivers!).

As mentioned in Chapter Two, self-excited oscillators are susceptible to frequency shifting if assembled with flimsy wire. Play it safe: use heavy buss wire for interconnections, add rubber feet to the breadboard to isolate hand key vibrations, and use a stout antenna that does not blow in the breeze and "swing" your transmit frequency. Also, continuously monitor the transmitter's frequency with your modern transceiver to assure in-band operation. **Staying within your license allocations is your responsibility!**

The most logical way to begin assembling this Golden Classic Of Yesteryear involves laying out its diligently acquired parts on a wooden board of your choice. If you're building a 5 to 10 watt version, a 5 by 10 inch board should work fine; a 9 by 12 inch board is preferred for high power rigs. Sand and shellac or stain the board for high eye appeal, or use one of the really fancy craft store-obtained decoupage' wood "plaque boards" for an ultra deluxe appearance. They truly make classic rigs look glamorous. Position all parts for easy interconnections with minimum wiring overlap. Keep everything neat and straight; tank circuit on the left, tube on the right, and Fahnestock clips around board edges for external connections. Authentic "acorn" condensers, beehive insulators and body-end-dot colored resistors are preferred, but modern substitutions are acceptable until original replacements are located. Check all "oldies" for proper operation/continuity with your **VOM BEFORE** installation to ensure "first time operating success." Effective filament bypassing and exact center tapping of the filament's resistor (or a center tapped transformer) are also very important for producing a beautiful CW note. A photo of the "Big H" and its general layout is shown in Figure 3-12.

Specific tank circuit L/C values determine this rig's operating frequency range. Many homebrewers find that attractive because a coil can be wound to "fit" an on-hand tuning condenser, but that also means "tinkering" (without an antenna connected to the rig!) until a desired frequency range is achieved. Remember to maintain a reasonably high L/C ratio, and you'll be in good shape.

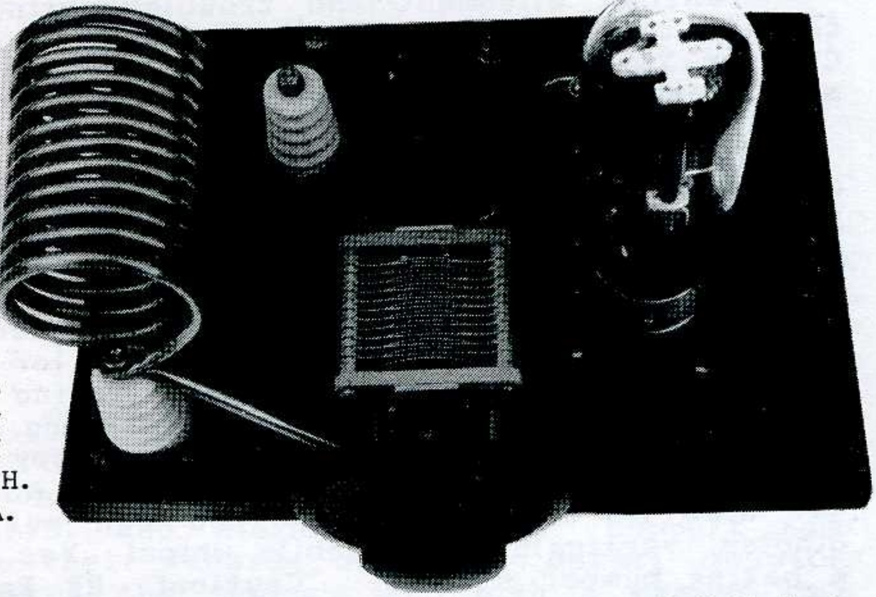


FIGURE 3-12. Author's transmitter, showing general layout of components in the Big H. Tube is a genuine 203A.

Plate coils for this transmitter are comprised of 1/4 inch soft copper tubing wound with an inside diameter of 2 1/2 inches. Twelve (12) turns are used for 80 meters. Mate that 4 1/2 inch-long coil with a 450 to 500 pfd wide-spaced tuning condenser. Eight (8) turns of that tubing "stretched" to a 4 1/2-inch length and mated with a 200 pfd tuning condenser covers 40 meters. Ventures above these bands should be handled with caution: a full rotation of the tuning condenser can "swoosh" a signal from 10 to 13 MHz! I mated a 6-turn copper tubing coil (2 1/2 inches diameter, 4 inches long) with a 150 or 200 pfd condenser for 30 meters. The rigid coil and heavy rig wiring worked great and was "rock stable" after parallel "tweaking" with an extra 200 pfd fixed condenser (It first "hit 11.2 MHz, and shifting it to 10.1 MHz required careful stepping...things get more "frequency sensitive" as operating ranges increase). Looking in old handbooks, incidentally, we also found 3-turn copper coils being used for 20 meter operation, 2-turn coils for 10 and one-turn "loop" for 5 meters. Lordy! They'll work, but we will let you perfect their stability! Modern PVC pipe makes a nice coil form, and filling the copper tubing with sand makes winding easy. After winding, empty the sand and use steel wool for polishing the coil to a high DX luster; then spray them with clear plastic to retain the shine. Coil tap points are found experimentally as outlined in Chapter Two. A simple yet effective antenna coupling coil is assembled by winding 4 turns of insulated number 16 or 18 hookup wire in a close spaced 2 1/2 inch diameter loop.

Secure it with tape, then slip it 1/3 the way between a couple of the plate coil's turns or over the end of its' supports. Monitor the transmitter's signal here: adjust for maximum output power with minimum "frequency pulling."

Testing, alignment and troubleshooting of the "Big H" follows the same procedure described in the QRP rig of Chapter Two. It is not repeated here, thus assuring your maximum info-for-dollars value.

A good 1930-style mating antenna is a 1/4 wave Marconi worked against a solid earth ground with plenty of radials. Antenna length is calculated using the formula: 234 - frequency (in MHz) = length (in feet). Be sure the antenna is rigid to avoid "warbling notes" when transmitting on windy days. **As a "finishing touch" to that antenna (or any other radiator you may use), add a small NE-2 or modern equivalent neon lamp at its far/high-sky end.** During transmissions, the neon will ionize and blink with your keying. Evening amateur visitors can then look in the sky and copy your Morse! The little "rinko" neon plug-in night lights sold in drug stores can also be used here, and you can put 'em anywhere...on dipoles, verticals, even mobile whips! Yes...and you can add a mating bumper sticker: "**Caution! RF Radiation**" to deter "bumper riders!"

Assuming a well-regulated and highly filtered DC supply is used, this transmitter will emit a beautiful CW signal on 1988's amateur bands. Draw a pencil arc off the tank coil (beautiful, eh?). Key the B plus line and watch those blue voltage flashes across your bug (Vibroplex sells replacement contacts, and they have a toll free/800 number). Listen to that note (melodic indeed!). Now this is ham radio supreme!

Pure Gold: A Genuine Push-Pull TNT Transmitter

Connoisseurs of pure nostalgia beauty, arise: this genuine classic from our romantic past is dedicated to you! It uses a pair of any previously discussed triodes (245s, 210s, 211As, etc.) in a Push-Pull TNT (Tuned plate, Not Tuned grid) configuration for dynamite DXing. That's right: twin globes plus dual antenna pickup coils and the resultant glamor of old-time radio at its golden best! Fasten your seat belt and say hallelujah: The **Thrill Is Back!**

This gem uses the same copper tubing plate coil and tuning condenser outlined in our previous "Big H", so refer back to that data and "hang on" as we zip forward with additional TNT points of consideration. The rig's circuit diagram is shown in Figure 3-13.

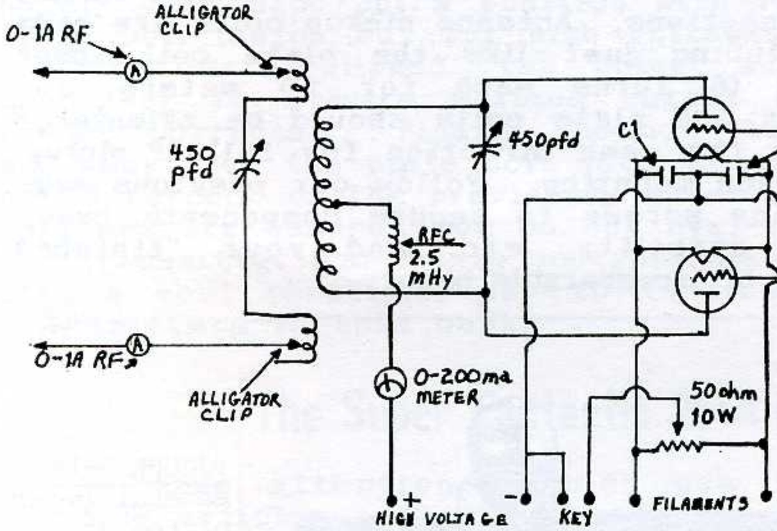


FIGURE 3-13. Schematic diagram of Push-Pull TNT transmitter. Filament & plate voltage depends on utilized tubes.
C1 & C2 are 250 pfd.

The plate coil is supported at each end by 2-inch "beehive" standoff insulators, and similar "beehives" support each antenna coil at their "inside ends" to permit coupling adjustment. Flatten the tubing's end with a hammer, then drill a hole to fit the "beehive's" top screw. Use short pieces of copper tubing to also connect the coil and tuning condenser, and tighten bolts securely to minimize heat losses from high circulating RF currents (A good design idea for any of our self-excited circuits in this book). The grid coil is wound on a one-inch form of hard rubber or similar material, and it should be firmly mounted in place for good frequency stability. Tap the coil in its exact center.

GRID COIL DATA	
80 Meters:	72 turns #32 insulated wire tapped at 36 turns
40 Meters:	40 turns #28 insulated wire tapped at 20 turns
30 Meters:	28 turns #28 insulated wire tapped at 14 turns
20 Meters:	16 turns #28 insulated wire tapped at 8 turns

Note: All coils wound close-spaced on 1 inch form.

A guiding outline for TNT transmitter assembly is shown in Figure 3-14. Everything fits easily on a pine board or stained wall plaque approximately 8 by 15 inches. Tap the plate coil's center on its bottom side, connect the RF Choke, then pass that high voltage wire through a hole in the board for a professional look. Screw 8-inch long and 1-inch tall wooden "runners" onto each end of the board to raise it above the table and clear lower wirings. Drill holes along the board's rear and install six decorative screws with double top nuts to act as binding posts. Use separate big binding posts for antenna connections. Antenna pickup coils are made of 1/4 inch copper tubing just like the plate coil except only half the turns (6 turns each for 80 meters, for example). The antenna and plate coils should be orientated with their windings in the same direction for full RF pickup. Remember that point when mounting. Follow our previous suggestions on using brass screws to secure components, heavy wire for frequency stability, etc. and your "finished product" will be an item of incomparable beauty.

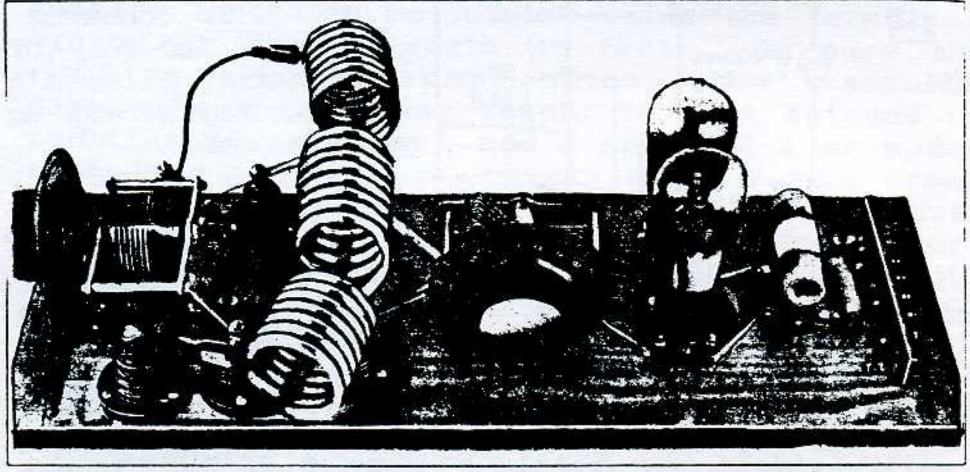


FIGURE 3-14. General layout of the Push-Pull TNT transmitter.

Tuneup and alignment of the TNT follows the same general concept discussed in our "Big H", so only "TNT-related notes" are included at this point. The TNT's utilized filament and plate voltages (and RF output) depend on your tube types: 245s with 350 to 400 plate volts will probably draw 100ma during operation (35 to 40 watts input). Always assure stable in-band operation before connecting your Zepp-with-tuned-feeders or dipole antenna (preferable with 72 ohm twinlead, but coax is acceptable). If the rig "yoops" or chirps without an antenna connected, check your power supply's current capabilities: over 50 volts key up/key down indicates excessive current demands.

The antenna coils should be carefully adjusted for equal RF pickup in each output wire or feeder. Adjustments should **ALWAYS BE MADE WITHOUT PLATE VOLTAGE APPLIED IN AN "ADJUST-THEN CHECK 'EM MANNER , ERE YOU WILL RECEIVE A TOOTH-RATTLING SHOCK OF REALITY!** Two identically calibrated RF ampmeters are preferred here, but you can "sneak by" using a small NE-2 type neon clipped to each coil's output connection. Later, you can also add small neons to each "side" of the antenna for quick-checking antenna current balance. Yes indeed...then you can look out your window and "tweak" transmitter tuning by watching your antenna's glow. Wow!

Loosen each pickup coil's beehive retaining bolt, then alternately vary each coil's position with respect to the main/-plate coil (watch out for high voltages!). Next, vary each coil's alligator-clipped "tap point" and vary the loading condenser to acquire maximum output (still assuring equal feeder currents). Finally, "swing" the antenna coils back and away from the plate coil until RF output decreases to 65 or 75 percent of the previously noted maximum power output. This measure assures you do not over-couple the antenna to the transmitter and create unstable operation (the concept is also a most beneficial way to tune/couple all self-excited transmitters in this book).

The Super Fantastic 204A Classic

A true attention-grabbing gem featured in several magazine articles and product ads of the 1930s was the "El Grande" 204A transmitter shown in Figure 3-15. This big bottle's filament really illuminates a small room, and its plate rating of up to 2500 volts at 200ma definitely put it in the "big time" category. Yes, friends, this genuine master of the airwaves is in a class all its own!

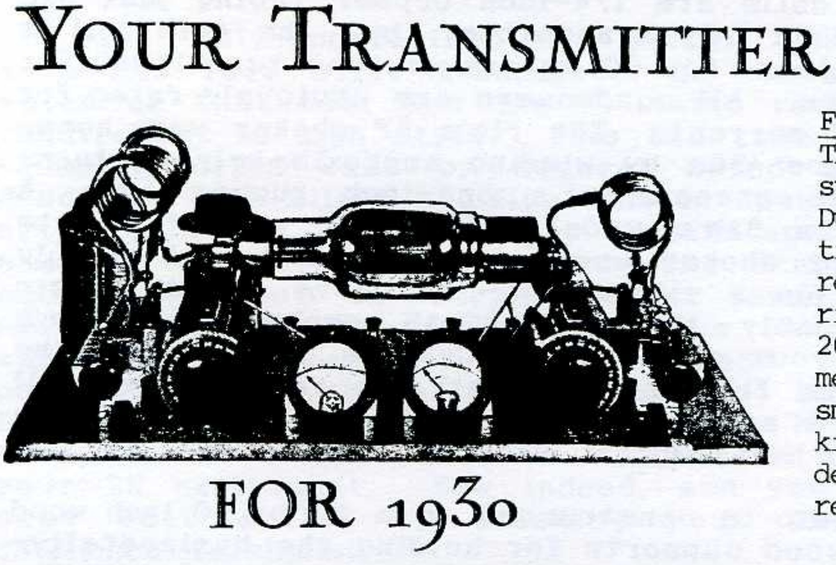


FIGURE 3-15.
The phenomenal 204A super rig of the '30s. During typical operation, the left meter reads 2000 volts, the right meter reads 200ma, and the filament's heat warms a small room. This killer oscillator definitely demands respect!

Anticipating the irrepressible gleam in our readers' eyes, the super power rig's schematic diagram is shown in Figure 3-16. Be forewarned, however, that gusto 400 watt open-air oscillators of this nature(!) must be approached with the respect of a bull elephant in dead "straight ahead charge." Indeed, our only modern-day analogy to this bug zapping, skin frying giant is converting your 572B or 3-500Z linear into an open cabinet oscillator for "stand alone" operation and putting it on-the-air "full bore." Whew! Don't even think about combining two big bottles into Push-Pull designs. You'll be lynched by your own coax!

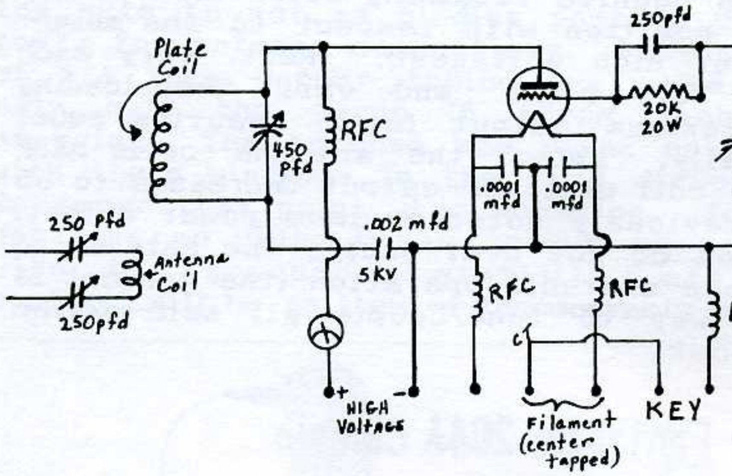


FIGURE 3-16. Schematic diagram of the fantastic 204A Classic. Caution! Vicious voltage on plate coil!

Although we are reluctant to encourage daily use of this hotter'n red peppers transmitter on the air today, we will briefly review some of its circuit details and construction notes for your reading pleasure and special events planning. The transmitter uses a Tuned Plate Tuned Grid layout with separate variable condensers in both circuits. The grid, plate and antenna coils are 1/4-inch copper tubing just like those in our Big H or TNT transmitter, but the grid coil is usually "two turns less" for 80 meters or "one turn less" for 40 through 10 meters. All condensers are obviously rated for several amps of RF current. The rig's RF chokes were home-fabricated during the '30s by winding approximately 40 turns of #30 wire double spaced on a one-inch rubber form. A modern equivalent is B&W's model 800 linear amplifier plate choke. The filament chokes were also homemade with roughly 26 turns #20 wire on a similar one-inch form. Their modern equivalent is probably the B&W FC-15 choke or Amidon's powered iron/"wind your own" kits at dealers nationwide. The rig is keyed in its filament's center tap return, and will obviously cremate a modern keyer. Indeed a bug's contacts will flash wildly with this colossal unit.

The 204A Classic is constructed on a 17 by 10 inch wood base with similar wood supports for holding the horizontally-positioned tube. Components are mounted securely to the board, and a center cutout is often included for tube cooling. The antenna coil is secured with bolts so it can be swung in position to vary coupling. Additional details are apparent in the transmitter's picture.

Initial checkout and alignment follows the same guidelines of our TNT transmitter described previously, although we urge holding this rig's high voltage to not more than 1000 volts. Assure stable in-band operation before connecting an outside antenna, then follow our previous TNTs notes on reducing antenna coupling to 70 percent of maximum output. The antenna's condensers should be adjusted for equal RF energy in each antenna wire or feeder as outlined in our Push Pull TNT setup. The grid condenser is adjusted to a slightly lower frequency than the plate condenser (recognized by cleanest note and highest power).

You are probably visualizing several "mix and match" possibilities at this point, so I will anticipate your questions. A 203A tube can be used in lieu of the 204A. A pair of 203As or 204As or T-20s, etc. could also be used in the Push-Pull TNT. All of our circuits thus far have been fairly "universal" and "interchangeable" if you keep a level head and watch their required voltages. Use an old ARRL Handbook as a "specs guide" and enjoy! Finally, understand we are not talking old tube and junk parts but prized collectibles. The goodies may no longer be "free for the asking," but they are worth paying a reasonable price. Finding them is the hard part. Good luck to every reader!

The "Two Stepper": A Classic '30s Receiver

The only comparison to getting on-the-air with an authentic 1930 style transmitter is operating a full-blown setup of that era, and the following receiver handles that requirement in high style. This two tube design was a well known favorite used by several noted manufacturers and described with slight modifications in numerous QST and RADIO articles of the '30s. Make no mistake about its performance, however; a properly assembled "Two Stepper" makes a good account of itself on today's amateur bands. Really! You may need to let it play on its own for a couple of hours after assembly to clear all the "Big Band" music out of its nostalgic grids, but after "acclimation" it will receive 1988 DX signals with amazing sensitivity. Why you'll probably have to add a seat belt to the station's chair to restrain your DX excitement. Yes indeed, and you can always check seat belt action by sticking your fingers across the earphones' terminals!

A brief study of the 1920-style homebrew receiver in Chapter Two, the SW-3's schematic highlighted in this chapter, and the "Two Stepper's" schematic in Figure 3-17 illustrates its obvious path of development. A new-era screen grid tube with an indirectly heated cathode is used in lieu of a simple triode for detection-plus amplification, regeneration is controlled by a potentiometer varying screen voltage, and a high gain stage of audio amplification is featured. The SW-3's circuitry is very similar to the "Two Stepper" except the detector is preceded by an RF amplifier (with its separate gain control), and a genuine audio coupler is used at the detector's output. A grid leak resistor and condenser are also "built-in" to authentic SW-3 coils whereas "outboard items" are featured in this unit. Audio couplers are nearly impossible to find these days (a 700 Hy choke!), so we substituted a simple R/C network for easy assembly (put it inside an old-time transformer case for authenticity). This and several other included ideas (like omitting the RF stage) are also interchangeable when restoring defunct SW-3s, etc. so use your imagination as we proceed.

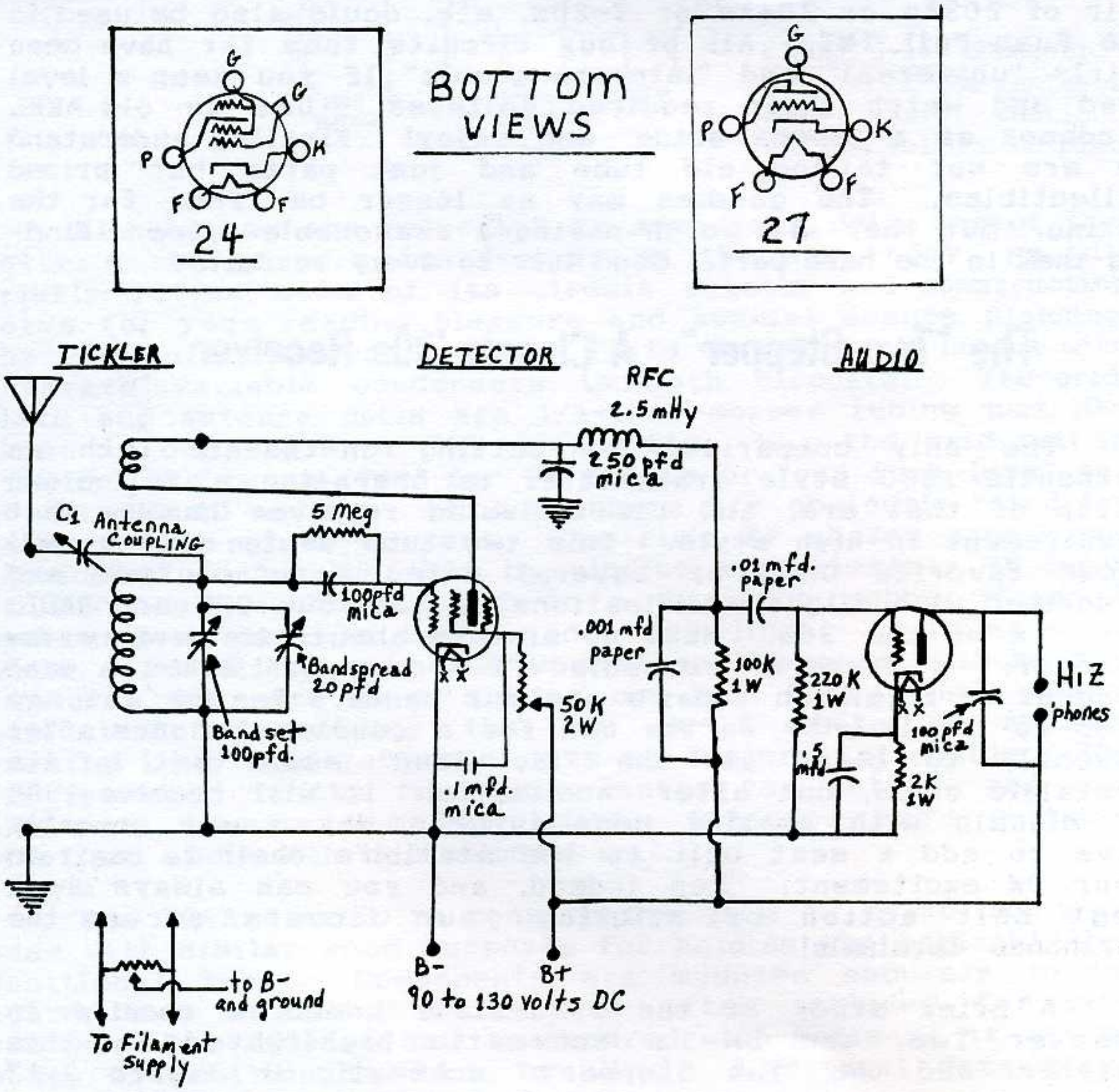


FIGURE 3-17. The Two Stepper 1930 Receiver. Unit performs surprisingly good on today's bands. If you are lucky enough to find a 700Hy audio coupler, refer to the SW-3's schematic for wiring and substitute it in this classic receiver.

General assembly of the "Two Stepper" begins after its original-era and/or modern-substitute parts have been acquired. Lay out the items on a shellacked pine board or metal chassis approximately 5 by 10 inches (see Figure 3-18).

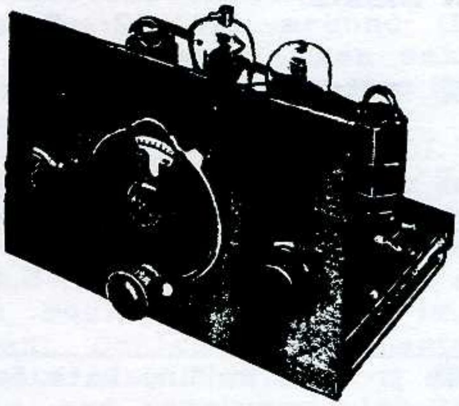


FIGURE 3-18. Basic layout of the Two Stepper receiver. Front dial is a National "Velvet Vernier" type.

Add a wooden or masonite front panel spray-painted black and "backed" with an aluminum sheet to minimize hand capacity. Be sure that sheet makes good electrical contact with the receiver's ground (and metal chassis, if used), otherwise you'll increase hand capacity. Check hamfest flea markets and old-time amateurs basements for a National Velvet Vernier dial: They're slightly difficult to find, but they add real "class" to the receiver. Try to secure several detector tubes so you can hand-pick the most sensitive one for DXing. If necessary, refer back to the SW-3's tube chart for substitutes according to availability. Note various filament voltages when swapping tube types! It's also possible you'll "wind up" with different filament needs for detector and amplifier stages. No problem...just use two transformers or batteries! Note, also, a center tapped resistor is necessary for minimizing hum from AC supplies. The earphones act as a plate load, so use high impedance types (2K ohm or higher).

Plug-in coils for the detector may be Hammarlund or Bud types if you're fortunate enough to find them (Grid" and "filament" pins are primary winding; "plate" and other "filament" pin is tickler). National coils are also grand, but they require 6 pin sockets. You will probably end up winding your own coils (possibly on tissue roll forms fitted to old tube bases) so refer to Table 3-2 for full details. "Spread out" the windings along the form's length for good receiver bandspread, and "tweak" exact turns counts for amateur band reception (remember our Chapter Two's hints). The "ground end" of L1 goes toward the form's lower area; the (small) plate/tickler winding goes below it. Both coils should be wound in the same direction. Reverse tickler winding connections if the receiver fails to oscillate/-regenerate.

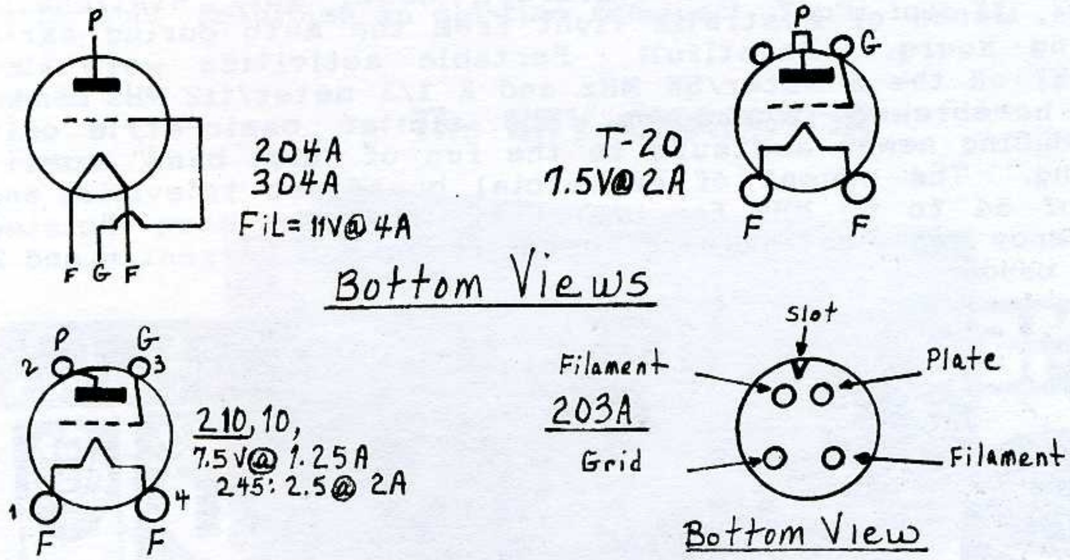
160 meters.	L1:	approximately 60 turns close-spaced.
	L2:	12 turns 1/4 inch below L1.
80 meters.	L1:	approximately 36 turns close-spaced.
	L2:	8 turns 1/4 inch below L1.
40 meters.	L1:	approximately 18 turns spaced for 1-inch length.
	L2:	6 turns 1/4 inch below L1.
30 meters.	L1:	approximately 13 turns spaced for 1-inch length.
	L2:	5 turns 1/4 inch below L1.

Table 1. Coil Winding Data for Two-Stepper Receiver.

NOTES: The coil form for L1 and L2 is 1 1/2 inches diameter and 3 inches tall. "Substitutes" can be made from tissue rollers mounted on broken tube bases, if absolutely necessary. L1 and L2 should be number 30 enamel wire for 160 meters and number 22 enamel wire for all other bands. "Ground End" of L1 should be at bottom of coil form (right above L2). Both L1 and L2 should be wound in the same direction. If the receiver doesn't break into self oscillation when the regeneration control is at maximum, reverse L2 connections. If desired, add/delete L2 turns until oscillation occurs at midpoint of regeneration control.

Initial checkout and alignment starts with rechecking your wiring and parts with a VOM, then applying voltages. After warmup, touch your finger to the 24's grid cap and notice a click or buzz in the earphones. Next, use Chapter Two's described technique of setting the rig to oscillate/-regenerate and "tune in" its radiating signal on your modern/digital readout receiver. You can then "tweak" coils and make calibration charts for later reference, as outlined in Chapter Two. Problems? Electrically "break the receiver in half" for analysis: connect a (weak) signal generator (set to the receiver's approximate range) to the antenna input and an amplifier (like your home stereo's auxillary input) "across" the "imitation audio coupler's" 100K ohm resistor (use a .01 mfd condenser in series with the stereo's positive line to block DC). Manually "sweeping" the generator's frequency should produce a noticeable output from your stereo if the detector is working. Likewise, injecting an audio signal "across" the amplifier's 220K ohm resistor should produce a noticeable earphone output if the amplifier stage is working. After both are confirmed working, connect a 50 foot outdoor wire and ground for reception and vary C1 for best signal copy without overload. Note, we said 50 foot; not a resonant antenna like a dipole (that connects to your 1930 transmitter. It also causes "suckout" or "dead spots" when the receiver "hits" the antenna's point of resonance). Finally, add a homebrew shield around the detector tube if excessive AC hum is noticed. Then enjoy super DXing with your full 1930 style rig. A genuine Mac Key or Vibroplex bug complete this beautiful setup.

After you have the "feel" of your 1930-style setup and have made a few contacts, you will surely be anxious to try big-time operating. Great! Each year, the Antique Wireless Association, P. O. Box E, Breesport, NY 14816, sponsors an on-the-air contest for 1930-style equipment and it is a blowout of fun (this is a different contest from Chapter Two's 1920 contest). Typical entrants use Hartley or TNT transmitters with 210s, 245 and 203s, and receivers with 24s and 27s, or SW3s. Join the action and relive those golden days of yesteryear in full glamor. You'll love it!



Pin connections for transmitting tubes used in this chapter. All are bottom views. Also, see last page of book for additional rig notes.

CHAPTER FOUR

GOLDEN CLASSICS OF THE 1940s & 1950s

A significant number of today's radio amateurs share fond nostalgic memories of the 1940s and 1950s, and with good reason. Many of us were young school kids during that time, initially getting into ham radio with a very high enthusiasm and a very low budget (Thank goodness for inexpensive military surplus gear, low cost parts and used receivers!). Many old-timers also remember the period as their debut in big time operating and DXing. The era started off a mite slow but shifted into high gear after the end of WW II.

Breadboarded and open-air/kit transmitters mated with commercially manufactured receivers were popular during the early 40s, but the times were-a-changing. By late 1950, fully enclosed rigs were commonplace, the "Donald Duck" sounds of Single Sideband were competing with AM, and the first SSB transceivers began appearing on amateur bands. Mobile operating was also increasing in popularity, espcially on the low power-favoring 10 meter band. Indeed, an amateur using a dynamotor-powered 10 or 20 watt AM transmitter and a Gonset broadcast radio converter could work stations in Alaska, Japan or Australia right from the auto during early evening hours. Beautiful! Portable activities were also popular on the 5 meter/56 MHz and 2 1/2 meter/112 MHz bands, with homebrewed "Rushboxes" and similar basic-style gear introducing newer amateurs to the fun of "high band" experimenting. The advent of commercial broadcast television and use of 54 to 60 MHz for channel 2, however, soon dictated frequency reallocations and the shift to our present 6 and 2 meter bands.

FIGURE 4-1. Some of the big name manufacturers and suppliers of the '40s and '50s.

Meanwhile, amateurs operating the lower bands used some of the "big name goodies" shown in Figure 4-1 for working plenty of worldwide DX. Remember RME receivers, Harvey Wells transmitters and Johnson Viking "battle cruisers?" DX coils and Bliley crystals set homebrew gear "perking" in high style, and Eitel McCullough tubes moved into a limelight position that continues as "top banana" today. What an era!

Briefly reviewing this era in an unbiased manner, let's recognize a few of the familiar and not-so-common names of the times. Hopefully your early equipment or "wish list" gear is included in the following discussion. A popular receiver among budget-conscious amateurs of the '40s was Hallicrafters Sky Champion shown in Figure 4-2. This classic beauty continues to exhibit surprisingly good performance on today's lower HF bands like 160, 80, 40 and 30 meters, especially when properly refurbished, and it is a collector's favorite item. Visualizing your own Sky Champion with a homebrew 6L6/807 transmitter, Zepp antenna and MAC KEY bug on 30 meters CW: the tubes warm glow, the key flashes with high voltages and the receiver dial's soft amber light. Sheer bliss beyond comparison! You can also turn that vision or dream into reality! Thousands of these receivers were manufactured, and they continue appearing in hamfest flea markets at attractively low prices. Save a beautiful memory from extinction! Refurbish an old-time receiver! You'll love it!

The SKY CHAMPION

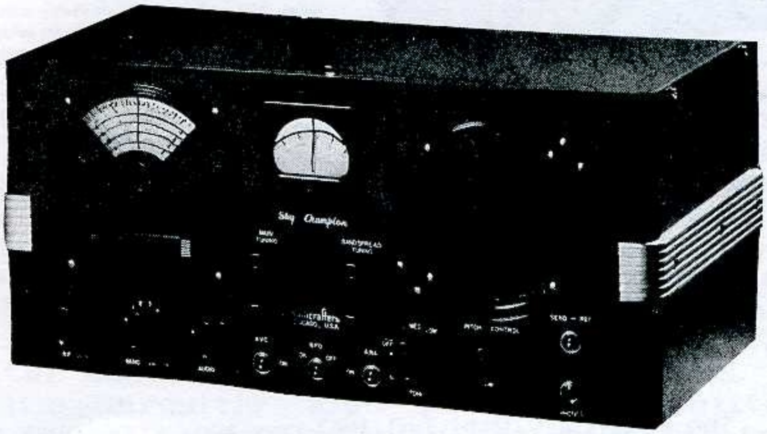
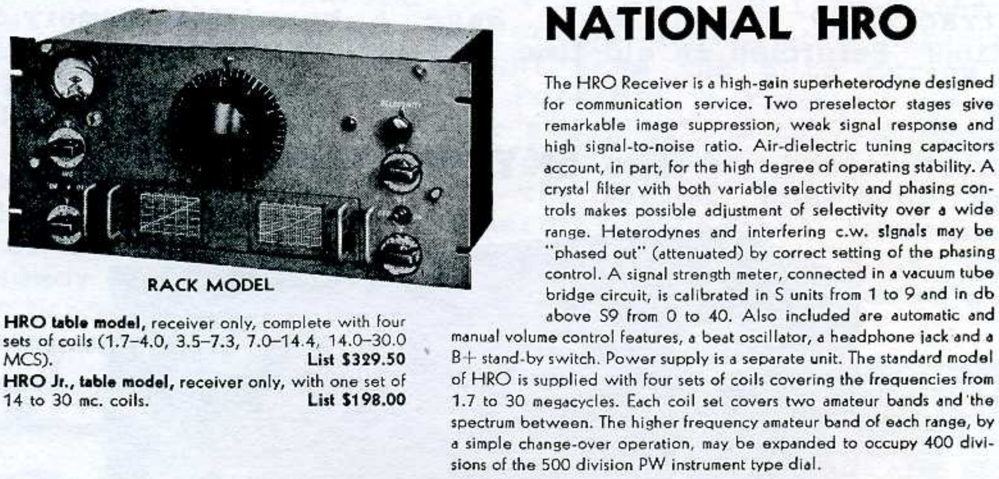


FIGURE 4-2. Hallicrafters Sky Champion was a hot performer with nine tubes and several special operating features.

The Sky Champion covered 550 KHz to 44 MHz; it included a noise limiter and nine tube circuitry. Its semi-enclosed main tuning dial and shock-absorbing speaker mounting brackets (for reduced acoustical feedback) added a true touch of sophistication. The original cost of this 32 pound gem was 54 dollars.

While National Radio continued production of the classic SW-3 regenerative receiver, their fantastic new HRO shown in Figure 4-3 began capturing the limelight. The legendary HRO featured a unique plug-in rack of RF coils and a special self-incrementing turn count dial. This superhetrodyne gem still performs admirably on today's amateur bands and is a highly sought unit among serious collectors. The HRO included a crystal filter with a phasing adjustment for "phasing out rotten QRM", and the plug-in coil unit included twist-lock switches for general coverage or amateur band operation. A lower cost version, the HRO Jr., was similar in appearance, but lacked S meter, crystal filter, and bandspread switching on its coils. Both units were supplied with 6 volt tubes and their AC supply was a separate unit. Truly legendary receivers!



NATIONAL HRO

RACK MODEL

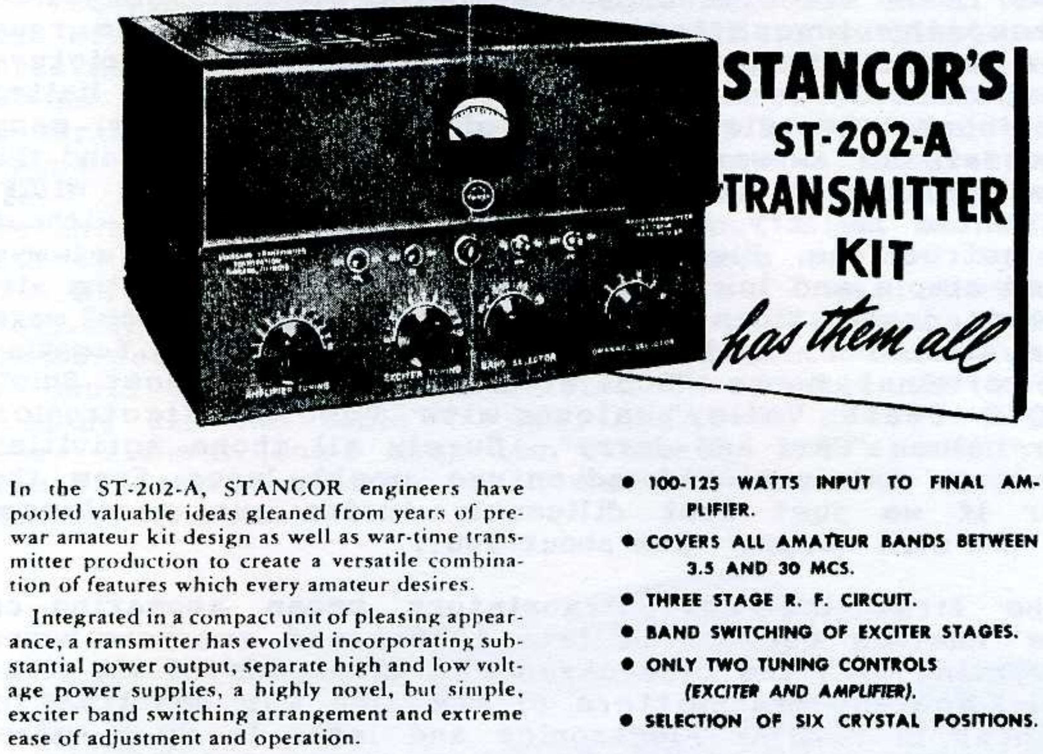
HRO table model, receiver only, complete with four sets of coils (1.7–4.0, 3.5–7.3, 7.0–14.4, 14.0–30.0 MCS). **List $329.50**

HRO Jr., table model, receiver only, with one set of 14 to 30 mc. coils. **List $198.00**

The HRO Receiver is a high-gain superheterodyne designed for communication service. Two preselector stages give remarkable image suppression, weak signal response and high signal-to-noise ratio. Air-dielectric tuning capacitors account, in part, for the high degree of operating stability. A crystal filter with both variable selectivity and phasing controls makes possible adjustment of selectivity over a wide range. Heterodynes and interfering c.w. signals may be "phased out" (attenuated) by correct setting of the phasing control. A signal strength meter, connected in a vacuum tube bridge circuit, is calibrated in S units from 1 to 9 and in db above S9 from 0 to 40. Also included are automatic and manual volume control features, a beat oscillator, a headphone jack and a B+ stand-by switch. Power supply is a separate unit. The standard model of HRO is supplied with four sets of coils covering the frequencies from 1.7 to 30 megacycles. Each coil set covers two amateur bands and the spectrum between. The higher frequency amateur band of each range, by a simple change-over operation, may be expanded to occupy 400 divisions of the 500 division PW instrument type dial.

FIGURE 4-3. The legendary National HRO receiver continues to enjoy a "top collectible" position among today's amateurs. Unit performs like a champ. Look for HROs at hamfest flea markets.

A less frequently recognized unit of 1940s fame was the ST-202A transmitter produced by Stancor, the Standard Transformer Company (see Figure 4-4). These impressive units still



STANCOR'S
ST-202-A
TRANSMITTER
KIT
has them all

In the ST-202-A, STANCOR engineers have pooled valuable ideas gleaned from years of pre-war amateur kit design as well as war-time transmitter production to create a versatile combination of features which every amateur desires.

Integrated in a compact unit of pleasing appearance, a transmitter has evolved incorporating substantial power output, separate high and low voltage power supplies, a highly novel, but simple, exciter band switching arrangement and extreme ease of adjustment and operation.

- **100-125 WATTS INPUT TO FINAL AMPLIFIER.**
- **COVERS ALL AMATEUR BANDS BETWEEN 3.5 AND 30 MCS.**
- **THREE STAGE R. F. CIRCUIT.**
- **BAND SWITCHING OF EXCITER STAGES.**
- **ONLY TWO TUNING CONTROLS** ***(EXCITER AND AMPLIFIER).***
- **SELECTION OF SIX CRYSTAL POSITIONS.**

FIGURE 4-4. Stancor's popular ST-202A 100-watt transmitter. Unit consists of a lower power supply section and an upper RF section. A very popular "collectible" that works great on today's bands.

surface at many hamfest flea markets, but they are easy to overlook because of subtle front panel layout. Check close...these gems are really worth their find-and-fix-up efforts. The ST-202A is a really hot performer with 100 to 125 watts input and coverage of all amateur bands from 3.5 to 30 MHz. The transmitter is super easy to tune with only two front panel controls...exciter and final tuning. The unit's other two controls select bands and one of six crystals. The unit is divided into two sections; a lower area (quite hefty) power supply and an upper area RF section. An external AM modulator was available for 'phone operation. The ST-202A's versatile circuitry also permitted substitution of several tube types to fit ones budget or "swap ingenuity", and its size of 9 by 13 by 14 inches (H,W,D) even fits modern desks of limited space. Visualize one of these beauties mated with a Super Pro receiver and operating on today's 30 meter band. Watch that iron-vane meter banging wildly...look at the classic glow of that red jeweled pilot lamp below the meter...feel the cabinet's warmth. That, dear friends, is classic amateur radio beauty supreme!

The 1950s are especially remembered by their abundance of noteworthy innovations, warm memories and glamorous amateur radio equipment. Indeed, describing the full picture of this beautiful era is totally impossible in our limited size minibook. Overviewing a few of those past times, many of us recall our awkward first days in amateur radio and the monthly guidance of QST's Novice Editor, Lew McCoy, W1ICP. If we wanted to "try our own hand" at homebrewing without exact instructions, Electronics Illustrated magazine always featured simple and low cost projects for getting on the air. Our young imaginations and visions of "ham stardom" were further kindled by additional reading like Walter Tompkins (K6ATX) original books "SOS at Midnight", "CQ Ghost Ship", and "QTH Death Valley" along with Popular Electronic's monthly column "Carl and Jerry". Surely all those activities of mystery, intrigue and adventure would lunge from the speaker if we just kept diligently tuning our receivers, right? (I'm still waiting. How about you?)

The first low cost transistors began appearing on dealers' shelves during the late 1950s, and everyone began experimenting with the blue-cased CK-722s. One of the first homebrew amateur transmitters of the time was described by Don Stoner in Popular Electronics and later in CQ magazine. The gusto 750 milliwatt 15 meter rig utilized some of the new "top hat" type 2N107s, however many of us were forced to substitute various "unknowns" (including CK-722s) with varying degrees of success.

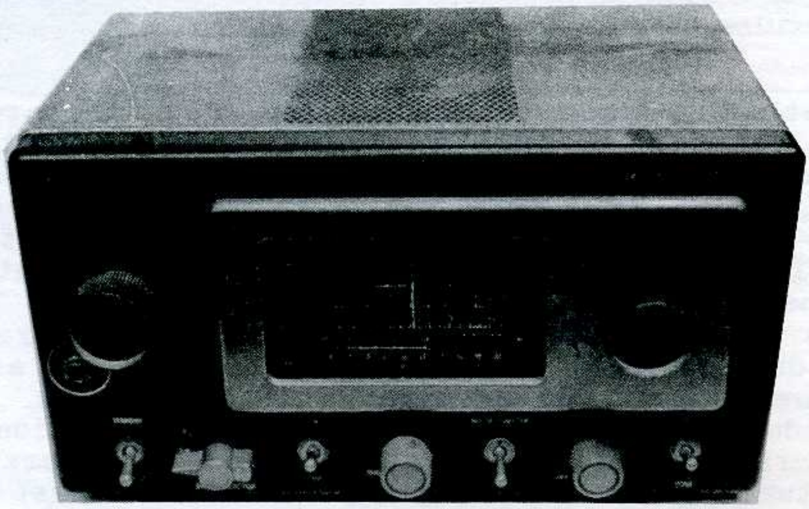


FIGURE 4-5 A low cost Hallicrafters favorite of the 1950s: the S-53 Receiver. Unit's inclusion of a RF gain control is a blessing for "zeroing" your classic transmitter onto a received frequency and for monitoring your CW during transmissions.

Looking closer at "store-bought" amateur gear, the '50s also brought a hearty array of both miliary surplus and high performance equipment to amateur circles. The pacesetter was Collins (naturally), but for those of us with limited funds, converted ARC-5 transmitters and BC-342/BC-348 receivers with random longwires or folded dipoles were a natural way of life. We liked to visualize living in high style with a Heathkit At-1 and Hallicrafter S-38 but alas, our "Elmers" with RMEs and Harvey Wells Bandmasters put us to shame! Ah...moving up to the "big time" was owning a "Halliscratchers" S-53 (Figure 4-5) with its half-decent bandspread and heartily appreciated RF gain control (at last we could monitor our transmitted CW without the receiver "jumping off the table"!). Why, the S-53 even received 15 meter signals (don't bump its cabinet!), and a popular "one element rotary" antenna really made working that rare VK or JA a reality. Wow!

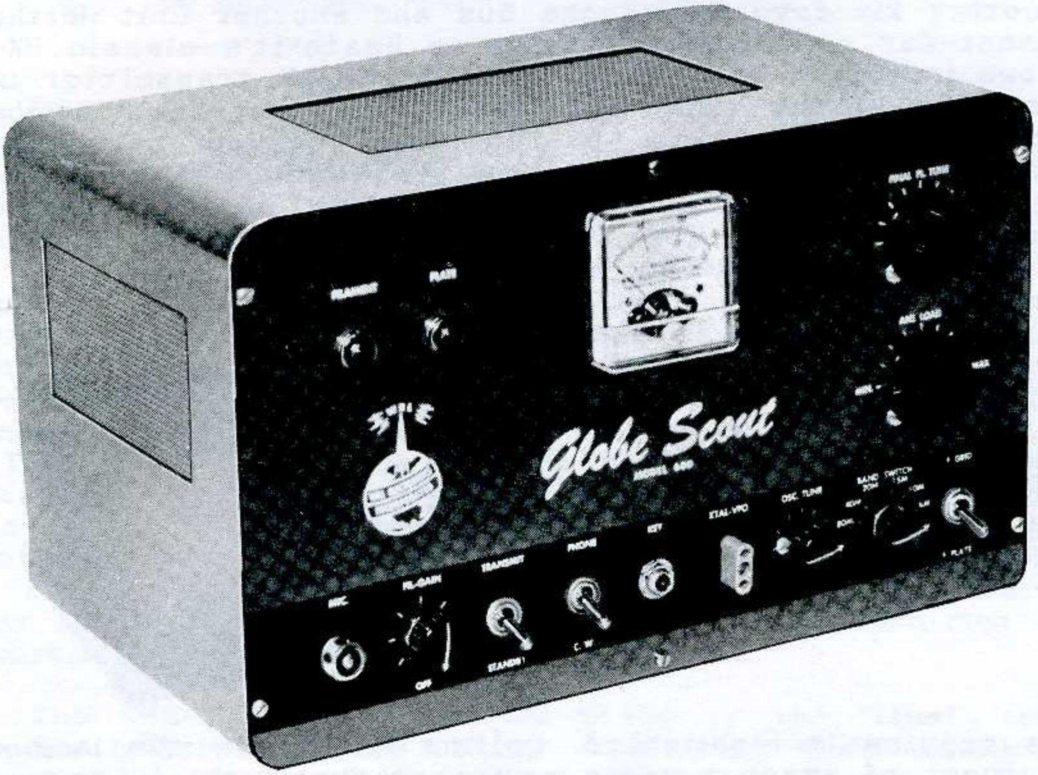


FIGURE 4-6. WRL's classic Globe Scout transmitter. Unit featured a 6146 driven by a 6V6, and matched antennas of 50 to 1000 ohms. These rigs still surface at various flea markets, and a restored Globe Scout is great fun to operate

Progressive steps were always difficult on a school boy's "paper route income"(?), but WRL's transmitters like the Globe Scout shown in Figure 4-6 often turned visions into reality. Yes indeed, and this beautiful classic even sported a 6146 final. That's an impressive 65 watts input! Next, an even better receiver was in order! Looking back over the 'Scout's specifications, we see it covers the 80 through 6 meter amateur bands with plenty of tuned circuit "overlaps". The 40 meter position, for example, tunes 6.4 to 10.5 MHz. Just add a new 10.104 MHz crystal with a series-connected "warping condenser", tune up the oscillator and final, and it's ready for action on today's CW-only 30 meter band: Add an S-53 and it's super fun all the way! Maybe you'll even pick up those old CQs from Arthur Godfrey, K4LIB, from his expedition to Africa (if you wrangle a QSO, however, our friends in white coats at the funny farm will be quite suspicious)!

Another kit favorite of the 50s and another unit worthy of present-day restoration efforts is Heathkit's classic DX-100 shown in Figure 4-7. This 125 watt CW/AM transmitter is a true heavyweight made for long term, key-down action (remember Tommy Tompkin's DX-100 that stayed on 'phone transmit for over an hour in "SOS At Midnight"?). Look at the green VFO dial. Visualize the fidelity of its AM audio. Imagine using one on 160 meters today. That's better'n driving a Silver Shadow Rolls!

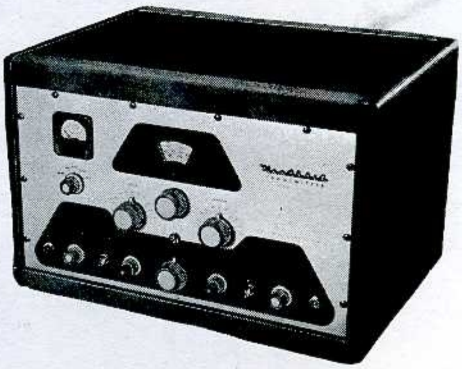


FIGURE 4-7. Heathkit's ever-famous DX-100. Unit was a DXers dream, and its 125 watts could literally work the world!

As previously highlighted, Collins Radio was the leading manufacturer of amateur radio equipment during the 1950s (and '40s, '60s, etc.). Indeed, thousands of devoted Collins fans and Collins-only collectors still grace our ranks and sport basements or dens chocked full of the legendary gear. Surely our readers remember the classic "32 series" of Collins equipment that was superceded by the familiar "75A series" receivers and "KW" transmitters...which was later superceded by the "S" line. During 1957, Collins introduced a revolutionary new unit that changed and shaped the direction of equipment we use today; namely the SSB transceiver.

The KWM-1 shown in Figure 4-8 was amateur radio's first Single SideBand and mobile transceiver. This true "collector's pride" covers any 100 KHz range between 14 and 30 MHz, as determined by plug-in crystals, and its 3.1 KHz mechanical filter provides incomparably beautiful audio on both transmit and receive. A bandswitch per se is not utilized in the KWM-1. Instead, a particular coverage range crystal is selected and the rig's exciter and final tuning controls are set for operation within that range. The previous adjustments, incidentally, are front panel-calibrated in MegaHertz. The KWM-1's main dial and S/Plate current meter are mounted in a center escutcheon, and its mike gain control functions as a carrier level control on CW. We personally secured and refurbished one of these gems to like new condition a couple years ago, and it continues perking beautifully...especially on 20 and 12 meters (we often think it still copies Ack, W4ECI, calling Gus, W4BPD, on expedition to Tibet and Chagos, but that's beside the point!). Twelve meter conversion and operation with the 'M-1, incidentally, is a snap. Merely order a crystal from JAN (address in Chapter Three), plug it into the crystal box, dial 25 MHz on the exciter and final controls, "tweak" your settings, and enjoy glamorous audio that stands out from "modern rigs" like a sparkling clean car on a dirty freeway.

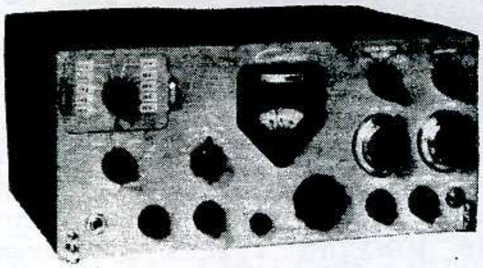


FIGURE 4-8. Amateur radio's first and continuously famous SSB transceiver: The Collins KWM-1. Unit sports a 3.1KHz mechanical filter, beautiful SSB audio, and adding one crystal adapts it to the new 12 meter (or 18 meter) band. A collector's pride!

The KWM-1 uses a pair of 6146s in the "final", and it includes roller inductors rather than conventional condensers in its output circuitry. Yes! You can "roll off" any desired inductance to select ranges. In fact, some amateurs even added extra capacitors to various circuits for operating the 'M-1 on 75 meters. The 'M-1 was reviewed in April 1958 QST, and its mod for 75 meters was described in May 1958 QST. While KWM-2s (and KWM-380s!) continue operating in hundreds of amateur setups across the country today, original KWM-1s exhibit a special glamor that must be operator-experienced to be fully appreciated. May the Collins legend of excellence endure forever!

Collecting, Restoring & Operating Classic Gear

Some folks enjoy rebuilding old automobiles, restoring old homes or reworking vintage broadcast receivers, but friends, nothing compares to refurbishing and using 1940s or 1950s gear on today's bands. AM may be dying but CW lives forever! Really! And low power rigs still "Work The World" on CW! Modern transceivers with their digital dials and instant-on/no-tune operation are great, but amateurs are natural-born "knob spinnners" and manually tuning a rig fills a vital need in our delicate lives! Likewise, the "full band view" of analog dials lets us see "where we've been" and "where we can go" rather than merely "where we're at" (the digital dial). Anyone can contact other stations with a small transceiver and simple antenna, but using yesteryear's "big rigs" carries the same impact as enjoying a gusto romp in an old-time "Caddy" or '57 Chevy convertible. Don't merely take our words on these statements. Try it for yourself and see! It's more fun than playing tricks on Farmer John's old tom cat!

The first step in that direction is obviously acquiring a gem from the past, and hamfest flea markets are "prime picking." You should get there early and make a special effort to check each load of "vintage goodies" before they are displayed (ere someone "beats your time"!). Paying full "asking price" will probably be necessary, but remember we're talking prime gear here, not junk! Get all info possible from its owner, including manuals. Make a list of all its tubes (and large capacitors if you're really "into refurbishing) then purchase a full "new round" at that same 'fest (they will never be available at a lower cost, and you'll always need them).

After returning home, use your test gear and new parts for restoring your prize. Old filters and bypass capacitors should be replaced, a soft bristle brush should be used for general cleanup, and new tubes always breathe "fresh life" into any rig. IF and driver stages are next aligned using the rig manual's guidance. Every unit differs in specific maintenance and alignment procedure, but that unit's manual is your personal tudor. No one understands a rig better than its own designer and there is no better source of information than an original-equipment manual. Use it religiously, and follow its directions to the letter. Remember also, your modern station items can be used for checking RF power levels, frequency stability, dial calibrations, and various oscillator actions. Proceed according to your own technical expertise. If you prefer getting complex internal work done professionally and limiting your own endeavors to tube swaps and outer case "fix-ups", that's also a great idea (consider this as a fun project; not a brain-teasing endeavor).

Several privately operated service shops stand ready to assist you. They are listed in the rear/want-ad section of monthly magazines. Your ultimate results will be a genuine "like new" old-time setup; not a junk rig for the garage (and there is quite a distinction!).

Adding WARC band operation to older amateur gear is often surprisingly easy. The wide range tank circuits in many tube-type transmitters cover 30 and 12 meters without modification (just add crystals, and "tune-up"), and general coverage receivers directly tune those frequencies. 30 meters is an especially attractive band for these operations. Its location between 40 and 20 meters yields many hours of enjoyable operation every day, and its power restriction of 200 watts assures small rigs with basic antennas an "equal chance" for successful communications. Performance of older receivers tend to "fall off" above 12 or 14 MHz, but they work fine on 10.1 MHz/30 meters. If your refurbished transmitter exhibits difficulty tuning up on 30 meters, merely shift its tank circuit's tap from its 40 meter position to midway between 40 and 20 meters. Do the same thing for oscillator coils, then re-mark the knob's front panel setting and join 30 meter fun. JAN Crystals in Florida can supply 30 meter crystals, and you can add a series 50 pfd trimmer in series with that crystal for "warping" its frequency a few KHz. The main areas of 30 meter action (10.100 to 10.108 and 10.115 to 10.122 MHz) can be covered with two "warped crystals".

Ham band-only receivers can also be modified for 30 meters (or other WARC bands) by changing crystals in their first local oscillator and removing a couple turns from their RF amplifier's 40 meter coils. Double conversion receivers typically down convert desired ranges to "hit" a 455 KHz IF. After that point, the receiver doesn't know if incoming signals are 1.8 MHz or 18 MHz. In other words, simply modify the particular unit's "front end" and you "have it made"!

Several of the folks we've contacted on 30 meters recently have been enjoying vintage rigs like an SX-28 and DX-35 or Sky Champion and homebrew transmitter. It's a blast! Come on in and join the fun! There's more! Every winter a "Classic Radio Exchange" contest is held for operators of 1940 and 1950-vintage gear. The contest is usually announced in November and December amateur magazines. Watch for it! Interested in reliving the beautiful days of AM? Join SPAM: The Society for Promotion of AM! Membership is free. Contact F. Dunlap, WA5TWF, 14113 Stoneshire, Houston, Texas 77060, with an SASE for details. Now look back through this chapter's rigs, spot your own "dreamboat", and get rolling toward real amateur radio fun. Relive a legend! Recapture the romance! Drag out those chrome-plated D-104s,

gang, the golden age of vacuum tubes will rise again!

Build The Legendary 6L6 Transmitter

How many times have you visited a friend and been introduced to a special conversation piece with its associated story of "fantastic achievements"? Ready to create your own "one upmanship" trophy of unsurpassed pride? Settle back and read on, amigos, the 1940/1950 6L6 transmitter described herein is guaranteed to prove your own "great wonders with rotten cucumbers" in high style! This little rig was the "bees knees" of quick home assembly for over two decades, and after you've used it to work the world, it makes a great conversation piece for the den or state room.

We usually include various substitute tubes, but like Coke™, there's no replacement for the real thing. Use a genuwine 6L6GC...the glass bottle with the glowing filament! Yes! Rejoice, dear brethren, those Novice days of old returneth!

We're moving fast with this rig's discussion, so check Figure 4-9 and fasten your seat belt! The rig can be assembled on a breadboard or metal chassis, as you desire. Be sure all grounds connect to a common buss. Mylar or paper capacitors rated above 200 VDC and 1 watt resistors are used.

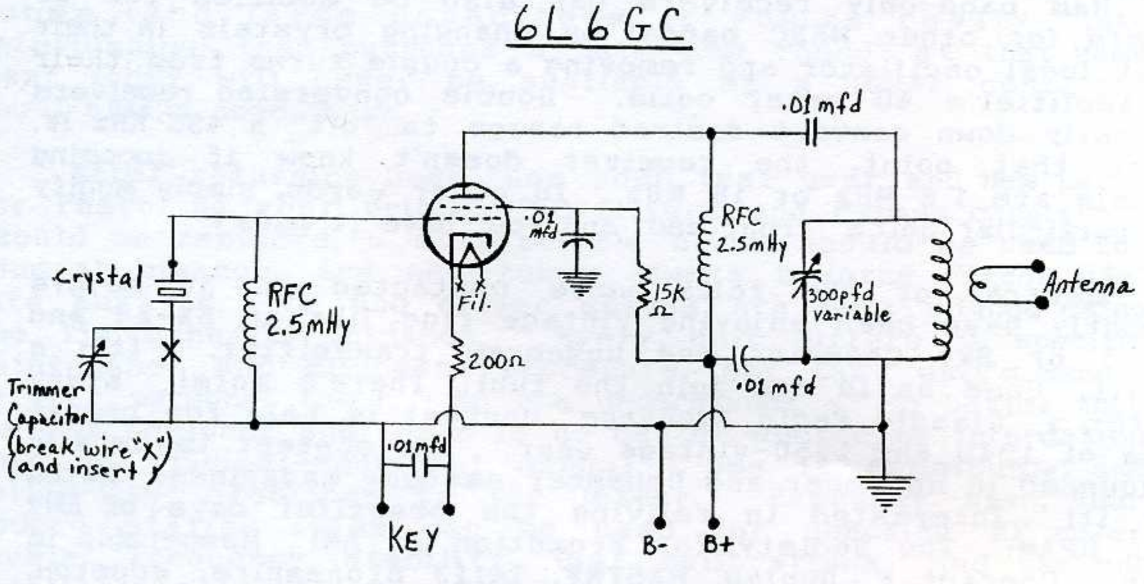
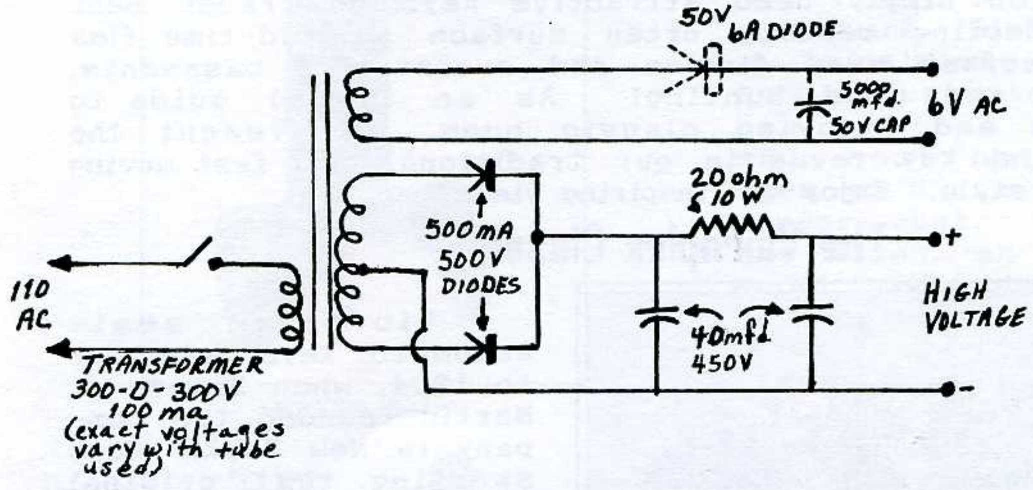


FIGURE 4-9. The legendary 6L6 transmitter. Is there a red blooded reader that does not remember the 6L6?

Plug-in coil forms 1 1/2 inches in diameter or tissue rollers fitted onto old tube sockets are used for supporting the plate and antenna coils. They are wound with number 18 wire. The 80 meter coil is 22 turns, 40 meters is 15 turns, and 30 meters is 12 turns. All antenna pickup coils are five turns on the same form. The 6L6 requires 6.3 volts for its filaments and 150 to 300 plate volts. If a suitable "hamfest special" transformer is not available, wire two 6 or 12 volt transformers "back to back!" After rectifying and filtering, you'll have 150 volts DC...perfect!

After assembly, apply filament voltage and connect a 100 or 200 ma meter in series with B+. Key the rig, then tune its plate condenser for the traditional "dip". If that dip is below 30 ma, add a 365 pfd variable capacitor across the antenna coil, then tune the rig "pi net style" until it draws 60 to 70 ma. Check signal quality on a modern receiver, and tune a few ma "out of the dip" as required for a nice CW note. That's it...simple, quick, and effective. Mate the transmitter with an HRO receiver, then proceed to work 20-plus countries on 30 meters QRP.

After you collect QSLs for those impressive QSOs, make a beautiful wall display of the rig and its cards. Bequeath it to your descendants with the stipulation it's a family heirloom for perpetual wall display. Who needs a coat of arms when we have the great grandpappy's prized transmitter. Fantastic! Watch those green-eyed heirs turn electric blue with...sheer joy of your consideration!



"Utility-type" power supply suitable for use with this chapter's 6L6 transmitter or rigs in Chapter Three. Select a transformer according to your tube's required voltages. Dotted line/optional diode and capacitor in filament supply gives pure DC for eliminating AC hum in 1930 style rigs with direct heated filaments (see Page 59 for more info).

CHAPTER FIVE

THOSE FABULOUS BUGS

The overwhelming popularity of semi-automatic keys or "bugs" among today's amateurs is truly undeniable. Indeed, my previous CQ Magazine columns featuring bug views and key collections of K5RW, W2GDV, VE7FOU and many others created worldwide interest plus continuous requests for additional tales and views. Many on-the-air conversations also indicate numerous amateurs are starting their own collections of mechanical marvels from our romantic past. Great! Small key collections are not exceptionally expensive and require only miniscule room for display. Each little gem can be enjoyed in its full glory on today's bands...and with our classic rigs of previous chapters. Go for it! Key collecting is great fun!

There are no hard-set rules to finding, purchasing and using beautiful classic keys: most amateurs simply follow their instincts and "do their own thing." Some amateurs alternate their on-the-air use, some don't; some pay high prices, some don't. Everything here is variable! There is only one answer to what a particular key should cost: what the buyer will pay and the seller will accept! The difficult part is finding keys and bugs. Collectors usually swap rather than sell keys. Cash has miniscule value in these circles. You simply need attractive keys to trade! Best initial collecting results often surface at old-time flea markets, hamfest swap circles and overstuffed basements. Good luck and good hunting! As an initial guide to identifying and enjoying classic bugs, we present the following mini key revue in our traditional and fast moving CQ Magazine style. Enjoy the inspiring views!

The Vibroplex Classics

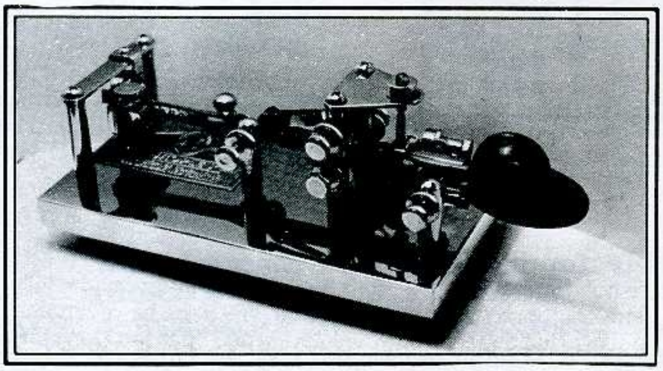


FIGURE 5-1

Vibroplex semi-automatic keys date back to 1904, when Horace G. Martin founded the company in New York. Bugs sporting that original Martin nameplate are now prized items among collectors. Vibroplex bugs are stamped only with a serial number; specific models are determined by

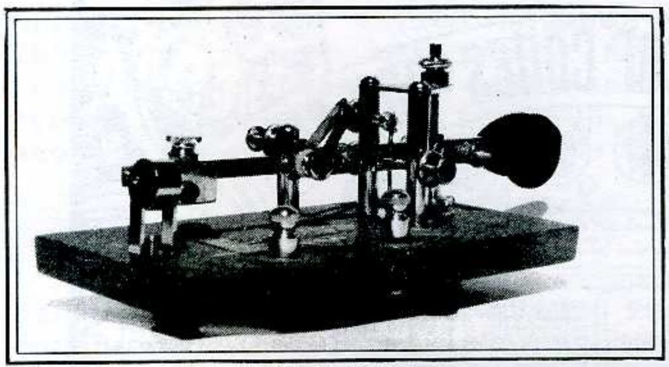


FIGURE 5-2

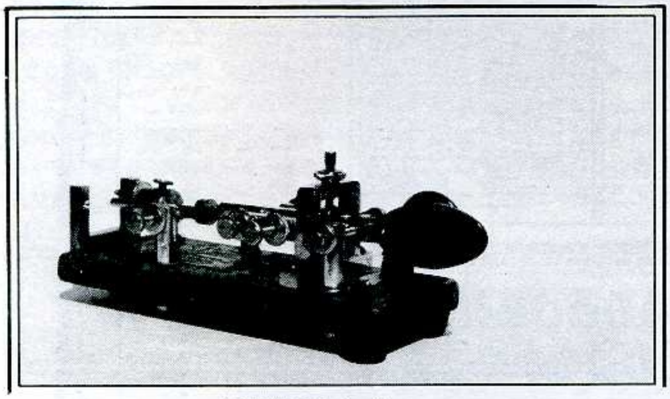


FIGURE 5-3

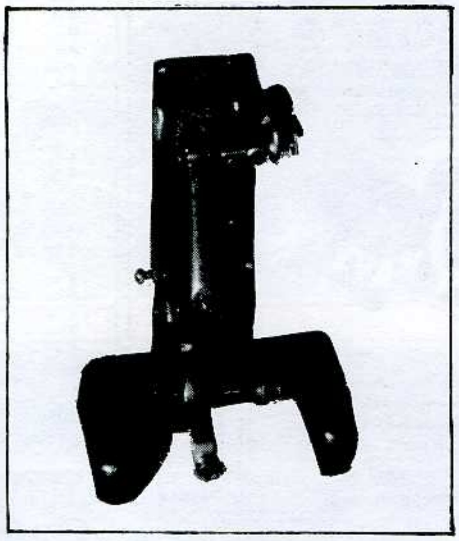
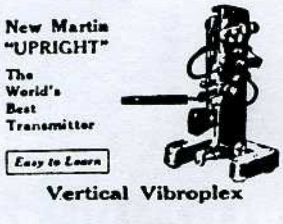


FIGURE 5-4



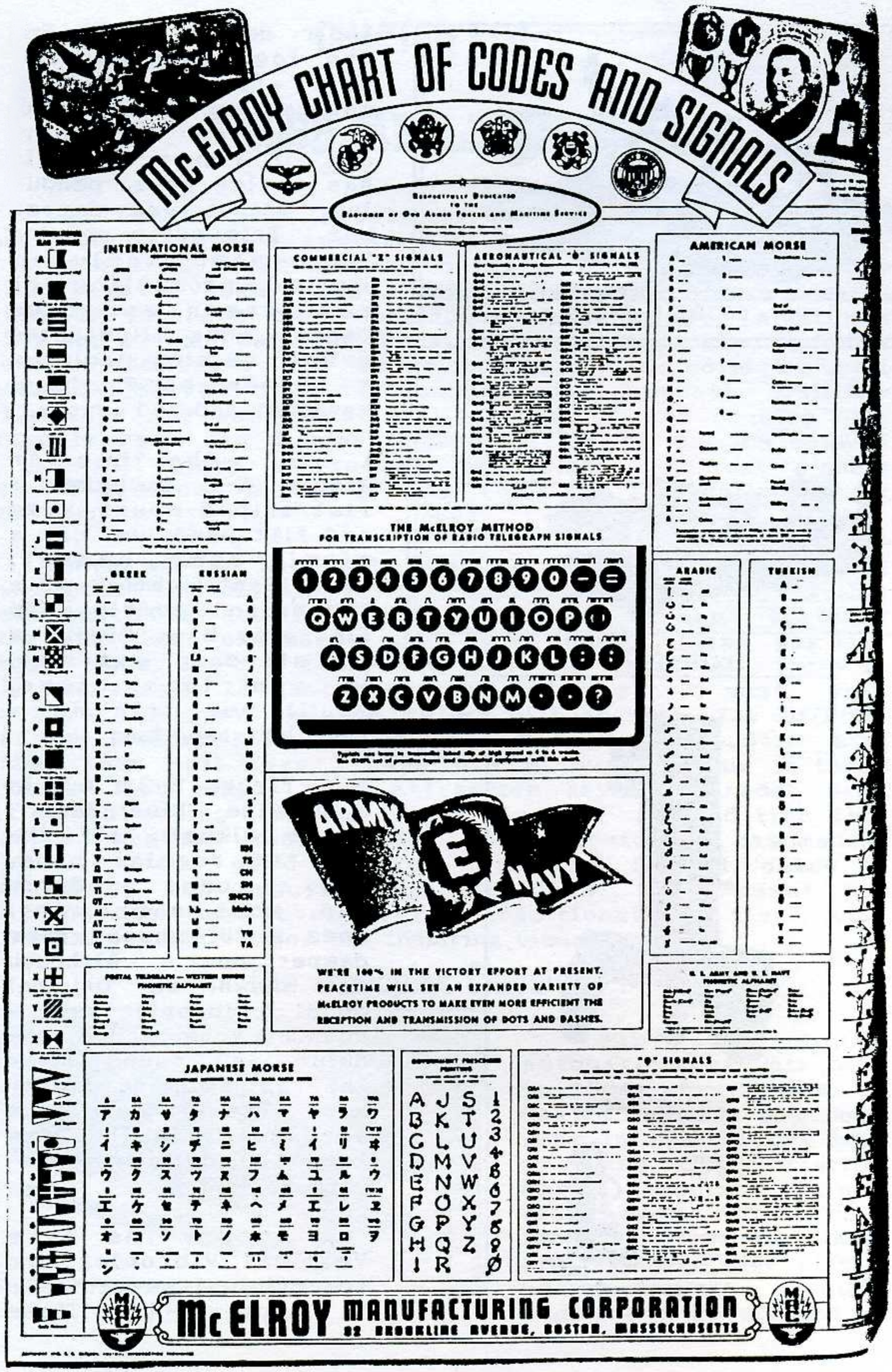
New Martin
"UPRIGHT"
The
World's
Best
Transmitter
Easy to Learn
Vertical Vibroplex

their design. The Red Bug logo, incidentally, only appears on bugs manufactured after 1920. Notice the "Lightning Bug" in Figure 5-1. It has a flat yoke, pendulum, weight and damper bar. This quite popular item also included limited production of red, green and blue bases. Our illustrated deluxe version includes a chrome base, jewel movement and red knobs.

The bug in Figure 5-2 includes a flat/tripod-mount yoke and flat pendulum, but a single-post damper: true identification of a "Champion" model. Its flat gray base signifies a "standard" version. If you look close, you'll see this is a rare left hand bug.

Figure 5-3's bug is a genuine "Blue Racer": it is almost half the size of regular bugs, has a round pendulum and, most noteworthy, uses a "U" shaped rear damper post. Although not shown, an "Original model " Vibroplex uses a rounded yoke, round pendulum and round "over the top" swinging damper arm. The previous bugs are usually in the "less than 100 dollars" category.

Notice the rare Vertical Vibroplex and its original magazine ad in Figure 5-4. These


McELROY CHART OF CODES AND SIGNALS
RESPECTFULLY DEDICATED TO THE RADIOMEN OF OUR ARMED FORCES AND MARITIME SERVICE
INTERNATIONAL MORSE
COMMERCIAL "Z" SIGNALS
AERONAUTICAL "Q" SIGNALS
AMERICAN MORSE
THE McELROY METHOD FOR TRANSCRIPTION OF RADIO TELEGRAPH SIGNALS
1 2 3 4 5 6 7 8 9 0 - =
Q W E R T Y U I O P
A S D F G H J K L : ;
Z X C V B N M . , ?
GREEK
RUSSIAN
ARABIC
TURKISH
ARMY E NAVY
POSTAL TELEGRAPH — WESTERN UNION PHONETIC ALPHABET
U. S. ARMY AND U. S. NAVY PHONETIC ALPHABET
JAPANESE MORSE
A J S 1
B K T 2
C L U 3
D M V 4
E N W 5
F O X 6
G P Y 7
H Q Z 8
I R 9
0
"Q" SIGNALS
McELROY MANUFACTURING CORPORATION
82 BROOKLINE AVENUE, BOSTON, MASSACHUSETTS

WE'RE 100% IN THE VICTORY EFFORT AT PRESENT. PEACETIME WILL SEE AN EXPANDED VARIETY OF McELROY PRODUCTS TO MAKE EVEN MORE EFFICIENT THE RECEPTION AND TRANSMISSION OF DOTS AND DASHES.

FIGURE 5-5. McElroy Chart of Codes and Signals. Remember learning to speed print Morse by his illustrated method?

prized gems are valued between 400 and 800 dollars each! They are dubbed "Wirechief's Key", as they require minimum room on a professional telegrapher's desk. Six months ago, a friend purchased one for 600 dollars. Two months later, another friend found one in a yard sale for 25 dollars.

The Mac-Key Legend

One of the most noted figures in high speed telegraphy during the '20s and '30s was Ted R. McElroy: The world's champion telegrapher. During 1939, McElroy set the world's record of copying 77 wpm: a feat that remains unchallenged today. Mac also traveled the country giving code proficiency demonstrations. One of his favorite stunts was pausing during a high speed run to drink a glass of water, then continue without missing a word of copy. Whew!! Mac soon formed his own company, manufacturing top-grade keys and instruction materials for the military and amateur market. Many old-time amateurs affectionately recall some of Ted's guiding notes illustrated in Figure 5-5.

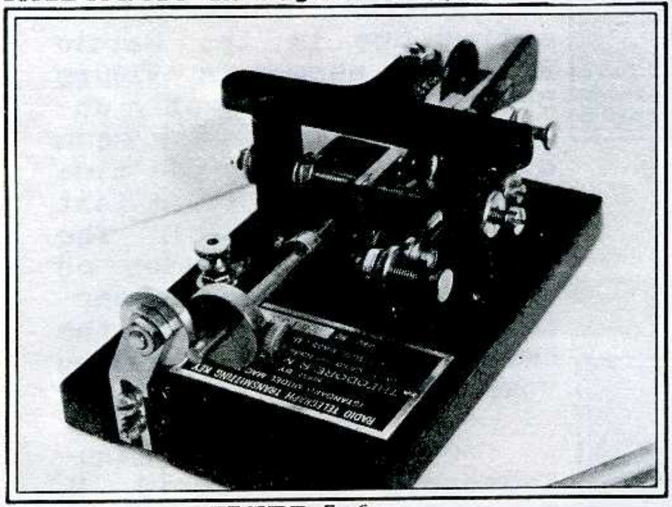


FIGURE 5-6

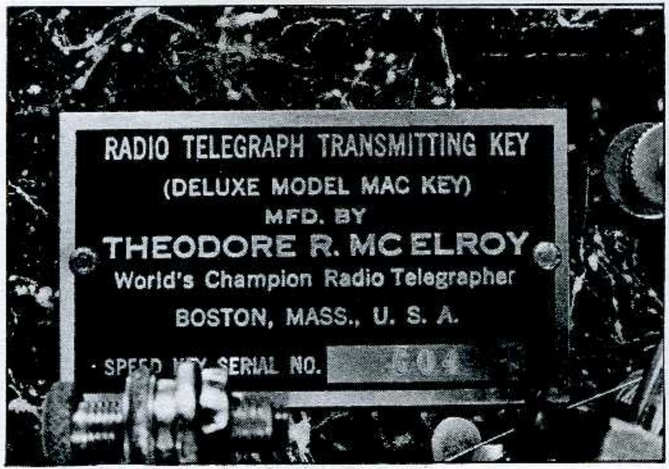


FIGURE 5-7

Mac keys included a unique "Tee bar" as a yoke (see Figure 5-6). The bar was used for easy carrying: curl two fingers around each side, lift and go. These keys have a superb "feel", and are great to use on the air. They can also be propped on a side and used like a regular hand key. Ted did not endorse chrome keys; he contended their bright reflections caused operator fatigue. Consequently, deluxe version Mac Keys featured a simulated marble base (see Figure 5-7). All Mac keys, however, included the famed "World's Champion" nameplate.

Another well-known bug manufacturer was DOW Key of Winnipeg, Canada. The especially interesting DOW in Figure 5-8 (shown next page) is solid brass, and is constructed with a unique right-tilt for comfortable operation. This gem takes a little "getting used to", but it is really fun to operate!

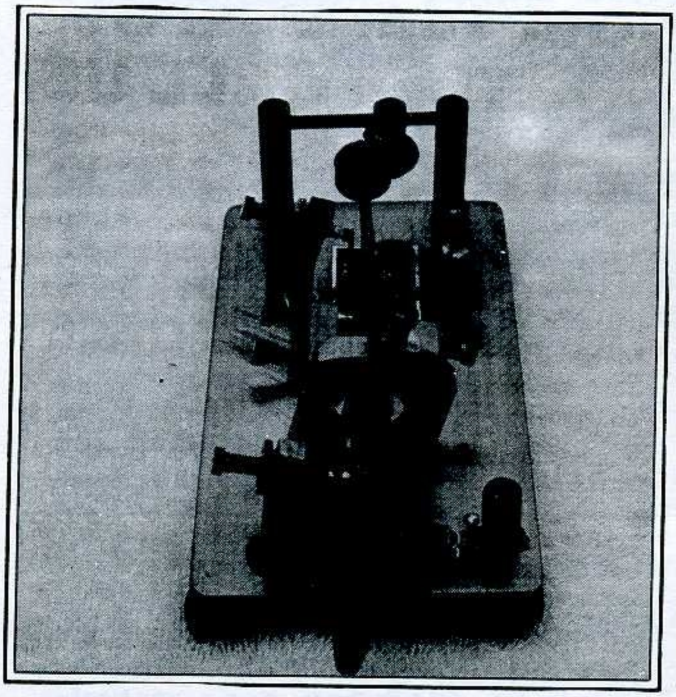


FIGURE 5-8

DOW's deluxe model shown in Figure 5-9 is super fancy, and a real collector's prize. The unit features a rotatable yoke, and can be adjusted for any preferred tilt...even left or right hand use, or rotated horizontally and used as a straight key. Beautiful indeed! (It's VE7FOU's favorite key.)

Another quite interesting bug is the Martin Rotoplex shown in Figure 5-10. W2GDV recently uncovered one of these gems at a New England flea market and says it is fast but has a nice feel. The yoke's unique rotation on several sets of ball bearings attribute to the key's name: a rotating yoke. Wow!!

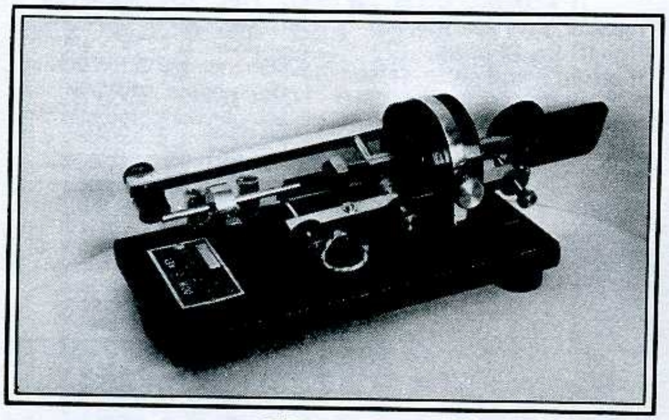


FIGURE 5-9

Other famed bug manufacturers included J. H. Bunnell (gold bug in Figure 5-11), Boulter, Emory, Codetrol, Mellihand, Speed-X, Logan, Signal Electric, a rare rotating wheel bug, and homebrew jobs ranging from "professional" to hilarious. The items shown in Figure 5-12, for example, were meticulously handcrafted by a Navy communications officer. They are finished in nickle. Subsequently, we recently received details of the home-assembled bug sketched in Figure 5-13. This ten-cent (honest) key is assembled on a wood base with a main vibrating reed (item A) made from an outgrown (no pun intended!) corset spring. The main arm is a metal strip with the corset spring bolted to its "far end." A sewing thimble filled with lead affixed to the spring's end serves as a weight and damper (item B). The fingerpiece is wood dowel. Small "L" brackets fitted with double nuts for adjustment serve as stops, and solder spread over screw ends are key contacts. Two small springs squeeze-fitted over travel-limiting screws adjust side tensions (item C). A replica of this dime store gem is easily assembled today with hardware-obtained items. A thin single edge razor blade can be substituted for the corset spring if you're...in a bind.

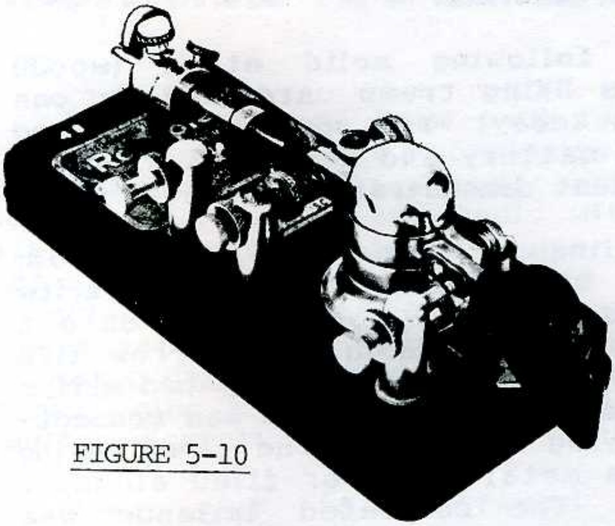
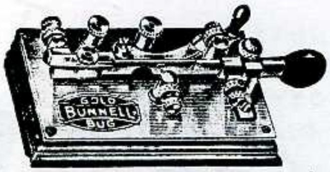


FIGURE 5-10



No. 398 Gold Bug Automatic Transmitting Key

FIGURE 5-11

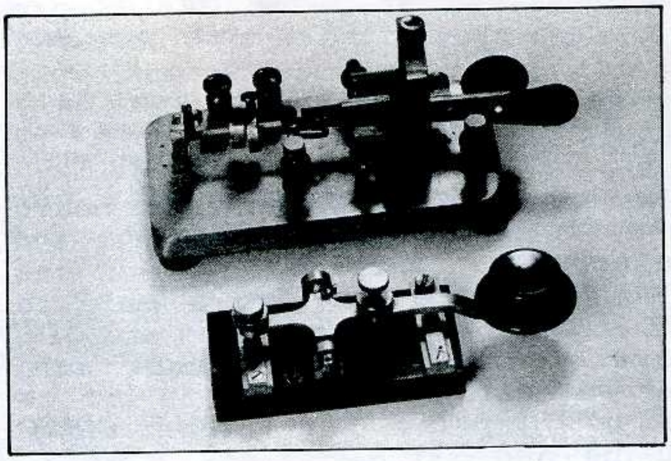


FIGURE 5-12

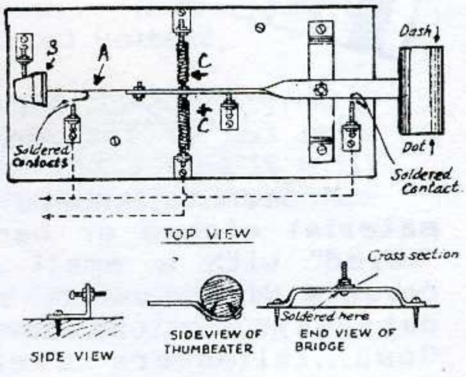


FIGURE 5-13

The Classic Tailender

Heads up, gang. The following solid state (wood!) memory keyer was yesteryear's DXing trump card, and you can make a genuine working replica today! You can enjoy it fixed or mobile, or even add a small battery and Radio Shack buzzer for stand-alone portable or hamfest demonstrations. Enjoy!

An assembly-guiding outline is shown in Figure 5-13. Original tailenders were made by securing thin metal strips coinciding to the dots and dashes of "de [your call]" onto a yardstick. A wide strip equalled a dash; a narrow (1/3 size) strip equalled a dit. After all properly spaced strips were yardstick-secured, a common-connecting buss was connected to them and to one rig-keying terminal. The other keying terminal connected to a simple metal wiper or filed alligator clip (notice cover picture). The completed tailender was then nailed to the edge of ones operating desk. During DX pileup operations, simply raking the wiper across the tailender at a constant speed sent "de [your call]." Neat, eh?

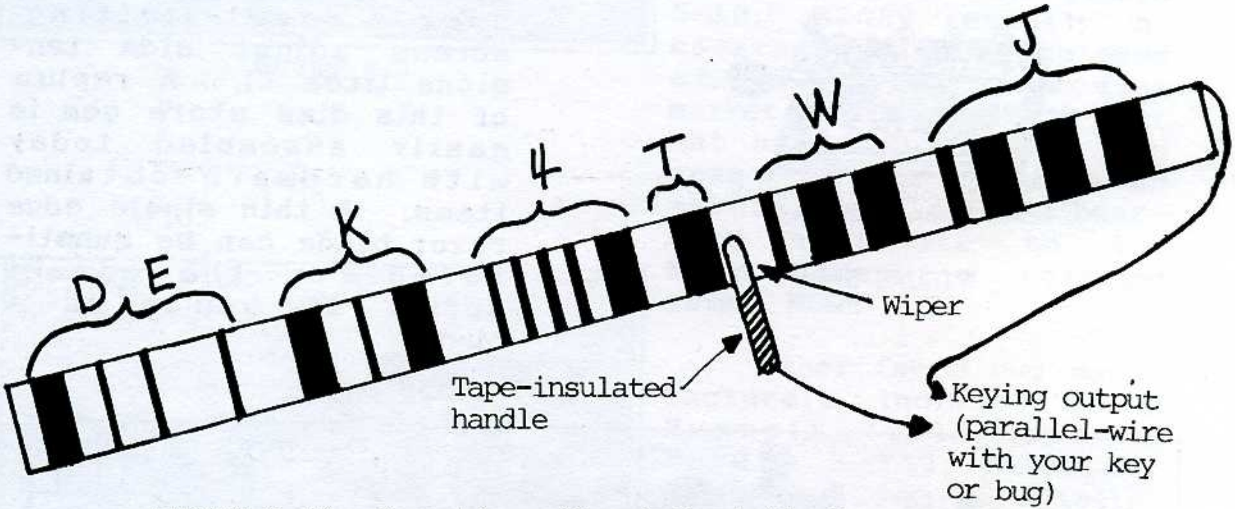


FIGURE 5-13. Assembly guide of the tailender.
White = metal, Black = insulation

Modern tailenders can be home-assembled using p.c. board material etched or hacksaw-cut with dot/dash spacings and "keyed" with a small alligator clip. Alternately, you can cover a thin aluminum strip with tape and then use a knife to cut away sections for your call...or a CQ...or name and QTH. Gosh...tailenders everywhere: on walls, ceilings, auto dashes! Yes, indeed...and as you tailend your way to fun, we will tailend our pleasure of bringing you these views. Thanks for reading, good DXing and 73! _.. . _._ ...._ _
._ _ ._ _ _ . ... ._ _ _... ...._ _ _ _ . .

ADDITIONAL TIPS ON CLASSIC RIGS & KEYS

A few amateurs have told us they have shied away from building rigs due to complexity. That's why this book's projects are simple, low power and quick assembled. They put the fun back in amateur radio without getting you into "deep water." If your fingers won't manipulate a beautiful bug, just move the dash's bottom strap to a (new) third connection, rubberband-stabilize its dot pendulum and use it as a keyer paddle! Alternately, just wire your keyer to make automatic dashes for the bug! One way or other, get cracking on returning the romance to amateur radio. You'll love the results. Honest!

Now, let's "fast forward" with some special notes relative to classic gear overall. If bandspread is a problem, slightly "stretch out" a coil's windings. Need even more bandspread! Place a small value variable condenser (50 pfd, for example) across a larger value fixed condenser (like 400 pfd). The "overall capacity" is then 400 to 450 pfd rather than 0 to 400 pfd.

Battery powered frequency counters (digital type) give exact readouts for old-time regenerative receivers and transmitters. Add back-to-back 1N34 or 1N914 diodes across the counter's input to avoid "RFing" it.

High current power transformers in power supplies are always desirable, as they assure good regulation and high frequency stability. You can "guesstimate" an old transformer's current rating by measuring its center lamination area with your fingers. Consider 100ma for each finger's width. A three fingered core equals 300ma (voltage, you know, can be measured with a VOM). Need more regulation? Use old "VR" tubes or new-fangled zeners. Wire them in series until they tally to your desired regulated voltage.

AC hum on transmitted signals with old triodes? Add a diode rectifier and 5,000 or 10,000 mfd condenser to get pure DC. It "worked wonders" in the old days, and I find it still solves entanglements today. Reverse filament-pin wires once a month for equal electron emission.

Warping capacitors in series with crystals are the next best thing to VFOs in 1940/1950 "store bought" rigs. Try them. Good luck & 73! K4TWJ

Any comments on how you like this book (and suggestions for "sequels" are always welcome....Dave, K4TWJ

ADDITIONAL READING

If you enjoyed our classic rigs, keys and views of yesteryear, the following additional reading is suggested.

MORSUM MAGNIFICAT. A 48 page magazine featuring keys and telegraphic tales of a thousand varieties. Includes want ad section for collectors. Published 4 times a year. Approximate subscription cost is 10 dollars, U.S. Contact: Tony Smith, G4FAI, 1 Tash Place, London N111PA, England for additional information.

DOTS AND DASHES. This newsletter-type magazine is published quarterly by The Morse Telegraph Club, Inc. It features key views and tales plus a good "swap section." Most club members were professional telegraphers. Contact club President, W. K. Dunbar, 1101 Maplewood Drive, Normal, Illinois 61761 for subscription/club membership and information.

THE OLD TIMER'S BULLETIN. The "cadillac" of old-time radio magazines. Includes stories, rig and key views, swap section and much more. This is a membership-related magazine, and includes details/results of AWA contests mentioned in previous chapters. Contact: Antique Wireless Association, Inc., P. O. Box E, Breesport, New York 14816 for more information.

CQ MAGAZINE. An always favorite publication with eclectic articles on classic rigs...and this author's World of Ideas column that highlights classic gear and keys at every opportunity. Contact: CQ Magazine, 76 North Broadway, Hicksville, New York 11801.

GOLDEN CLASSICS OF YESTERYEAR

A Super Collection of Rigs, Circuits, Tales & Keys From Yesteryear

by Dave Ingram, K4TWJ

Recapture the original fun and excitement of amateur radio with this special collection of tales, rig views, easy-to-build circuits and keys from our romantic past. Thundering back from the pages herein are hotter'n red peppers transmitters, receivers that still play big band music, big bugs, l'il bugs, gold bugs and bugs made from corset springs. Yes indeed! There are also Push-Pull TNT transmitters, one-tube Hartleys that worked the world, tailenders for DXing and antennas that blink with your CW. All these basic style weekend projects work great on today's bands. This book is a super "hands on" guide for kids of all urges! Fasten your seat belt, say hallelujah and get ready for old-time fun. The original thrill of amateur radio in all its glamor is back!

Noted author and CQ Magazine columnist Dave Ingram, K4TWJ, is one of the most popularly recognized and respected figures in amateur radio today. Intensely active in all areas of amateur radio for over 25 years, his enthusiasm is irresistibly contagious. In addition to broadcast engineering and teaching college electronics, Dave has authored over 300 articles and 12 books on amateur radio. Watch for even more from this noted author!